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Berkeley National Laboratory

TEN-YEAR SITE PLAN

2009–2018

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ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY
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Ernest Orlando Lawrence Berkeley National Laboratory Ten-Year Site Plan 2009–2018

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Acronyms and Abbreviations

ACI	Asset Condition Index
AEC	Atomic Energy Commission
AFRD	Accelerator and Fusion Research Division
ALS	Advanced Light Source
ASCR	Advanced Scientific Computing Research
AUI	Asset Utilization Index
BES	See “OBES”
BSO	DOE Berkeley Site Office
CAMP	Capital Asset Management Plan
CAS	Condition Assessment Survey
CEDR	Comprehensive Epidemiologic Data Resource
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRD	Contractor Requirements Document
CY	Calendar Year
D&D	Decontamination and Decommissioning
DM	Deferred Maintenance
DMR	Deferred Maintenance Reduction
DOE	Department of Defense
DOE	U.S. Department of Energy
DOE-EM	DOE Environmental Management Program
DOE-SC	DOE Office of Science
DR	Deferred Recapitalization
EERE	DOE Office of Energy Efficiency and Renewable Energy
EH&S	Environmental Health & Safety
FMECA	Failure Modes Effects and Criticality Analysis
EIR	Environmental Impact Report
EM	see DOE-EM
EMPA	LBNL Energy Management Performance Agreement
EPA	U.S. Environmental Protection Agency
EPACT	Energy Policy Act of 2005
ESnet	The Energy Sciences Network
FCI	Facility Condition Index
FIMS	DOE Facilities Information Management System
FY	Fiscal Year
GPP	General Plant Project
gsf	Gross Square Feet
GTL	Genomes to Life
HVAC	Heating, ventilation and Air Conditioning
IBX	Integrated Beam Experiment
IGPP	Institutional General Plant Project
IFI	Integrated Facilities and Infrastructure
ILC	International Linear Collider program
ITER	International Thermonuclear Experimental Reactor
LCLS	Linac Coherent Light Source
LIP	Line Item Project
LINAC	Linear Accelerator
LHC	Large Hadron Collider
LRDP	Long Range Development Plan
MF	Molecular Foundry
NASA	National Aeronautics and Space Administration
NCEM	National Center for Electron Microscopy
NEPA	National Environmental Policy Act
NERSC	National Energy Research Scientific Computing Center
NGLS	Next Generation Light Source
NNSA	National Nuclear Security Administration
NSF	National Science Foundation
NSF or nsf	net square feet

OASCR	DOE SC Advanced Scientific Computing Research Program Office
OBER	DOE SC Biological and Environmental Research Program Office
OBES	DOE SC Basic Energy Sciences Program Office
OFES	DOE SC Fusion Energy Sciences Program Office
OHEP	DOE SC High Energy Physics Program Office
ONP	DOE SC Nuclear Physics Program Office
OWDTS	DOE SC Workforce Development for Teachers and Scientists Program Office
OSF	Other Structures and Facilities
PAM	Performance Assessment Model
PED	Project and Engineering Fund
PY	Prior Year
R&D	Research and Development
RCM	Reliability Centered Maintenance
RIA	Rare Isotope Accelerator
RIC	Rehabilitation and Improvement Cost
RPAM	DOE Real Property Asset Management Order
RPV	Replacement Plant Value
SC	see DOE-SC
SC NP	see ONP
sf	Square Feet
SLI	DOE SC Science Laboratory Infrastructure program
SLAC	Stanford Linear Accelerator Center
TEAM	Transmission Electron Aberration-corrected Microscope
TEC	Total Estimated Cost
TRIC	Total Rehabilitation and Improvement Costs
TSCI	Total Summary Condition Index
TYSP	Ten-Year Site Plan
UCB	University of California at Berkeley
UCOP	University of California Office of the President
VE	Value Engineering
VUV	Vacuum ultraviolet
WMS	Work Management System

Preface

The 2007 Lawrence Berkeley National Laboratory Ten-Year Site Plan (TYSP) updates the May 2006 TYSP. The 2007 TYSP differs from the 2006 Plan as follows:

- An updated Current and Future Missions section, which includes descriptions of specific program developments and their facilities and infrastructure implications;
- An updated Facilities and Infrastructure section, which summarizes LBNL's proposal to the SC Infrastructure Modernization Initiative.

The 2007 TYSP includes LBNL's response to the Department's Strategic Plan which includes new Mission, Management Excellence guidance, including under Management Excellence, a new Goal for 2006 and beyond:

Goal 5.3, Infrastructure, to build, modernize, and maintain facilities and infrastructure to achieve mission goals and ensure a safe and secure workplace.

The 2006 Strategic Plan recognizes that DOE's infrastructure is aging, creating both safety and security concerns, DOE SC has proposed a facilities and infrastructure modernization initiative for the FY 2009 – FY 2018 period to address this issue and ensure all SC facilities are fully mission ready in 2018. LBNL's 2007 TYSP reflects planning work accomplished over the past six months by LBNL and DOE SC to advance this objective.

Purpose and Scope

The Ten-Year Site Plan (TYSP) is prepared by Lawrence Berkeley National Laboratory in accordance with the Contractor Requirements Document (CRD) provisions of the U.S. Department of Energy (DOE) Real Property Asset Management (RPAM) Order, DOE 0 430.1B:

- “Based on DOE-furnished program planning guidance, the contractor must
- a. assess the current real property assets against program mission projections,
 - b. identify the specific real property asset projects and activities required to meet program mission projections, and
 - c. propose a 10-year planning horizon through the development of a Ten-Year Site Plan (TYSP). . . .”

The Laboratory works with the DOE Site Manager in preparing this document; under the RPAM Order, the DOE Site Manager is “responsible for planning, programming, budgeting, and evaluation of activities in support of Secretarial office programs located on sites under his/her cognizance.”

The TYSP also supports preparation of the DOE’s Asset Management Plan (AMP), a requirement of Executive Order 13327 Federal Real Property Asset Management (February 2004). In accordance with the RPAM Order:

The TYSP integrates functional components of land use and real estate; facilities and infrastructure acquisition; maintenance, recapitalization, and disposition; and long-term stewardship into a comprehensive site-wide management plan. The TYSP requires assessment of past performance and projected outcomes and is intended to strengthen communication and accountability among programs, sites, and tenants.

The TYSP documents and ensures that DOE’s real property assets at each SC site are inventoried, available, and used in an effective and cost-efficient manner, and are in a suitable condition to accomplish SC’s and DOE’s missions.

This 2007 TYSP covers the FY 2009 to FY 2018 planning period and in addition, data for FY 2006 (one year of actual costs), 2007 and 2008.

A. Executive Summary

Overview

Action Plan Summary

Overview

As a U.S. Department of Energy Office of Science research facility, Lawrence Berkeley National Laboratory aligns with and serves the DOE's overarching mission "to advance the national, economic and energy security of the United States [and] to promote scientific and technological innovation in support of that mission" and the Office of Science's strategic goal "to protect our national and economic security by providing world-class scientific research capability and advancing scientific knowledge" (*DOE Real Property Asset Management Plan*, August 2005, p. 2).

Lawrence Berkeley National Laboratory (Berkeley Lab, LBNL, or the Laboratory) has a long and continuing tradition of scientific excellence, and the work of its scientists and engineers has been recognized with numerous awards and prizes, including eleven Nobel prizes. Among the SC Laboratories, LBNL is uniquely qualified and situated to achieve seminal breakthroughs under DOE's scientific mission in the early 21st Century.

The success of this research mission is dependent upon the facilities and infrastructure of the LBNL site. As modern science requires exacting operating standards, and as LBNL is home to numerous user facilities hosting many qualified researchers from other laboratories, universities, and industry, the performance and capabilities of the Laboratory's mission-critical facilities and infrastructure are closely monitored and managed. Still, LBNL's older research facilities and infrastructure must be modernized to efficiently and effectively support DOE research programs and sustain its world-class science efforts.

This TYSP outlines a safety and modernization program, centered on the DOE Office of Science's Infrastructure Modernization Initiative, which will modernize fundamentally sound but older research laboratory buildings, and replace the general purpose research and support facilities which can not be cost-effectively upgraded. This program will ensure that the Laboratory can effectively continue to meet its scientific mission requirements.

This TYSP covers the FY 2009 to FY 2018 planning period and in addition provides data for FY 2006 (one year of actual costs), 2007 and 2008. This TYSP outlines mission objectives for this period, and considers the overall condition and suitability of current facilities, the need to address safety issues, and the need to upgrade and augment current facilities to better match mission requirements.

Action Plan Summary

This TYSP proposes an action plan that will achieve four objectives:

Correct Seismic Life-Safety Hazards

Thirty-four percent (34%) of LBNL's total Hill Site and Donner Lab building space (~614K GSF) has been identified as seismically Poor or Very Poor. These buildings require life safety upgrades to their structural systems, or replacement where upgrades can not be cost-effectively achieved in order to effectively serve the DOE mission.

A program to achieve seismic life safety in the approximately 1/3 of LBNL's buildings that are identified to have seismic life safety deficiencies has been developed. Deficient general purpose and institutional facilities have been prioritized and integrated into the DOE Office of Science's Infrastructure Modernization Initiative. To ensure these buildings are fully capable of meeting mission performance objectives, necessary modernization work will be performed concurrent with the structural upgrade work. This approach will both minimize disruptions to the research programs and efficiently apply the limited resources. Seismic life safety deficiencies in Programmatic buildings are being addressed with support from the appropriate DOE Office of Science Program Offices.

Modernize Fundamentally Sound but Older Research Facilities and Replace those which can not be Cost-effectively Modernized

General purpose and Institutional facilities which are rated Seismically Poor or very Poor will be made safe and modernized under the SC Infrastructure Modernization Initiative (see preceding section). However, this SC funding can not be expanded to address the modernization requirements of the other older general purpose research and institutional facilities. Modernization of these facilities will be accomplished in concert with the SC Infrastructure Modernization Initiative by the Laboratory through a combination of Maintenance, Alteration, and IGPP investments.

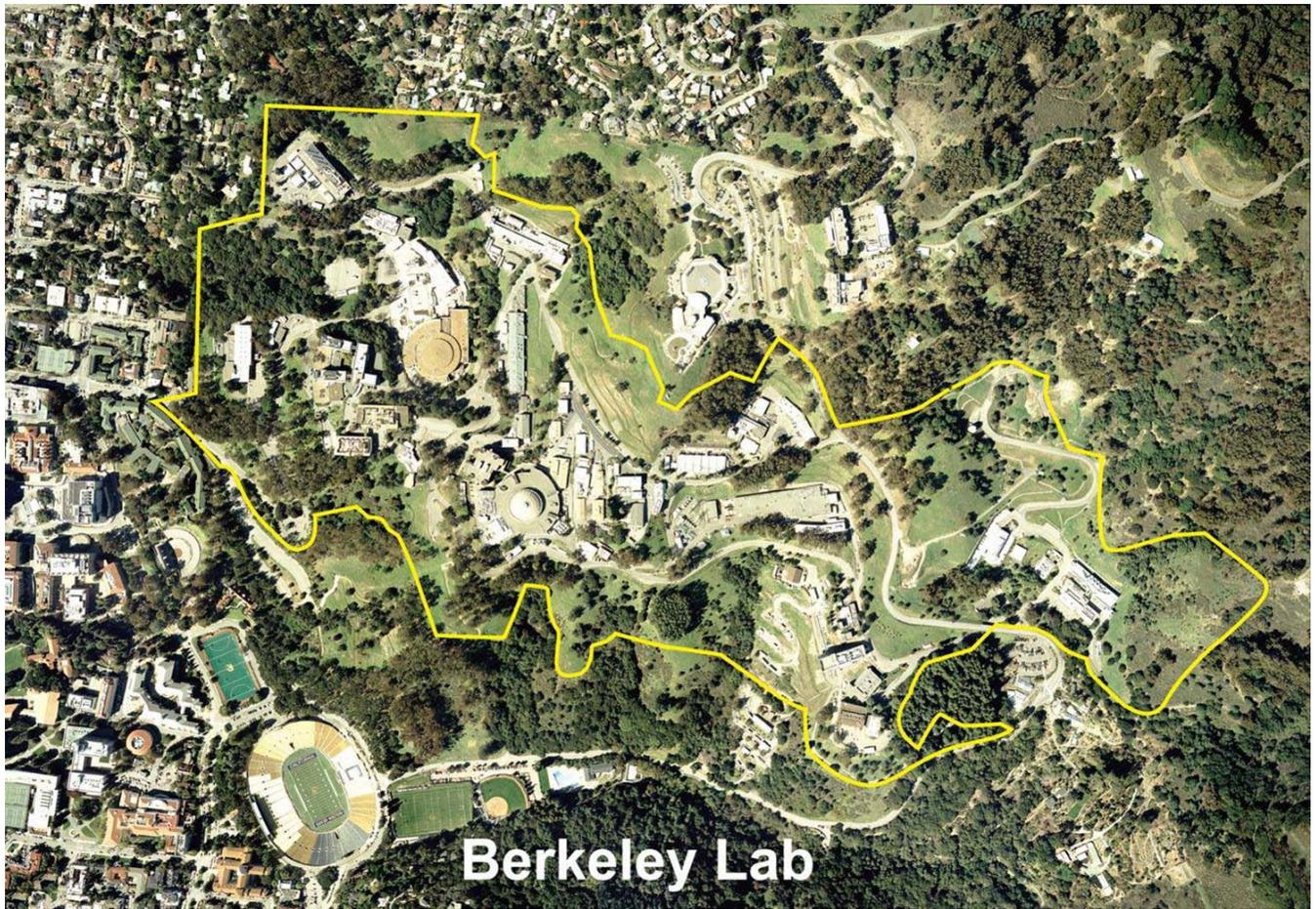
Support Office of Science Vision for Facilities for the Future of Science

Lawrence Berkeley National Laboratory fully supports the Office of Science initiatives outlined in SC's Business Plan prepared for LBNL and in the *Facilities for the Future of Science: A Twenty Year Outlook* on emerging scientific facilities. The SC FY 2008 Business Plan for LBNL highlights low carbon energy supplies (the Helios initiative), and Advanced Light Source upgrade, the Supernova Acceleration Probe for the Joint Dark Energy Mission (JDEM), Optical Accelerators for the Energy Frontier, and upgrades to the and the National Energy Research Scientific Computing Center (NERSC) Upgrade. *The Facilities for the Future of Science* outlook also includes the Supernova Acceleration Probe for the dark energy mission, an upgrade to the National Energy Research Scientific Computing Center (NERSC), an upgrade to the Advanced Light Source (ALS). The LBNL TYSP outlook also supports the upgrade to the Energy Sciences Network (ESnet), the Transmission Electron Aberration-corrected Microscope (TEAM) initiative, and an Integrated Beam Experiment for inertial confinement fusion energy.

Construct new Non-Federal Science Facilities

Lawrence Berkeley National Laboratory works with the Office of Science to construct Non-Federal facilities which support achievement of the mission. LBNL is working to construct three third-party/Non-federal facilities at its Hill Site. These buildings will provide on-site overnight accommodations to visiting researchers to the National User Facilities (which typically operate 24-hours a day), a new computational research and theory facility, and a new Helios Research facility.

B. Overview of Site Facilities and Infrastructure



LBNL is managed by the University of California for the Department of Energy. The Laboratory's primary location is the "Hill Site" (Figure 1). Additional space is occupied on the adjacent University of California, Berkeley campus, and in commercial leased space. DOE buildings on the Hill site are constructed on University of California Regent-owned land under long-term arrangements with the federal government.

Figure 1. LBNL's 203-acre "Hill Site."

Table 1. Statistical Summary.

Laboratory Established	1931
Area of Laboratory (Hill Site)	203 acres
Landlord Program	SC High Energy Physics

Total All Space (JGI = Joint Genome Institute)	2,156,885 gsf (including JGI)
	2,077,430 gsf (excluding JGI)

Space in Hill Site Buildings and Trailers	1,782,568 gsf
Buildings on Hill site (number of) [includes two small non-SC-owned facilities listed in FIMS (Building 31, a UC-owned facility that is solely used by DOE SC programs and is to be transferred, and Building 71T, an EERE facility)	108
Trailers (number of)	46
Real Property (46,820 gsf)	33
Personal Property (4,385 gsf)	13
Total Trailer Space	51,205 gsf

Space on UCB Campus (space occupied under terms of DOE/UC memorandum of understanding)	74,752 nsf/gsf
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Space in Leased Buildings (gsf) (current leased properties are located in nearby communities, including Berkeley, Oakland, Richmond, Walnut Creek (JGI), and Livermore, in addition to a small office in Washington D.C.)	299,565 gsf (including JGI)
	220,110 gsf (excluding JGI)
Leased Buildings (number of, excluding 4 JGI buildings)	8
Annual Lease Costs (figure does not include JGI):	\$6,607,567

Replacement Plant Value (RPV), 2007 (per DOE SC Guidance)	\$804,959,682
Programmatic (OSF 3000 category)	\$137,960,063

Age of Buildings, Average	40 years
% of space older than 40 years	65%
% of space between 21 and 40 years old	14%
% of space 20 years or newer	21%

Excess Facilities Identified—2007 and prior (to be demolished):	8
Excess Building Space Removed (gsf)	
FY 2005—Building 29D (276 sf) & LEHR credit (79,891 sf)	80,891 gsf
FY 2006—Buildings 67B, 67C, 71E	2,988 gsf
FY 2007—Building 10 (preliminary)	(15,200 gsf)

Maintenance Investment Index (MII) & Funds Allocated for Maintenance:	
FY 2006	\$19.794M
FY 2007 (projected)	(\$15.58M)

Deferred Maintenance (DM)	
FY 2006	\$52,882,301
FY 2007 (projected)	(\$51,903,453)

Total 2007 Summary Condition (TRIC = DM + RIC) :	\$184,246,654
Deferred Maintenance (DM)	\$51,903,453
Rehab and Improvement Cost	\$132,343,201

Total 2007 Summary Condition Index (TSCI): (% of Total RPV)	22.8%
Facility Condition Index (FCI) (based on DM)	6.4%
Rehab & Improvement Cost Index (based on RIC)	16.4%

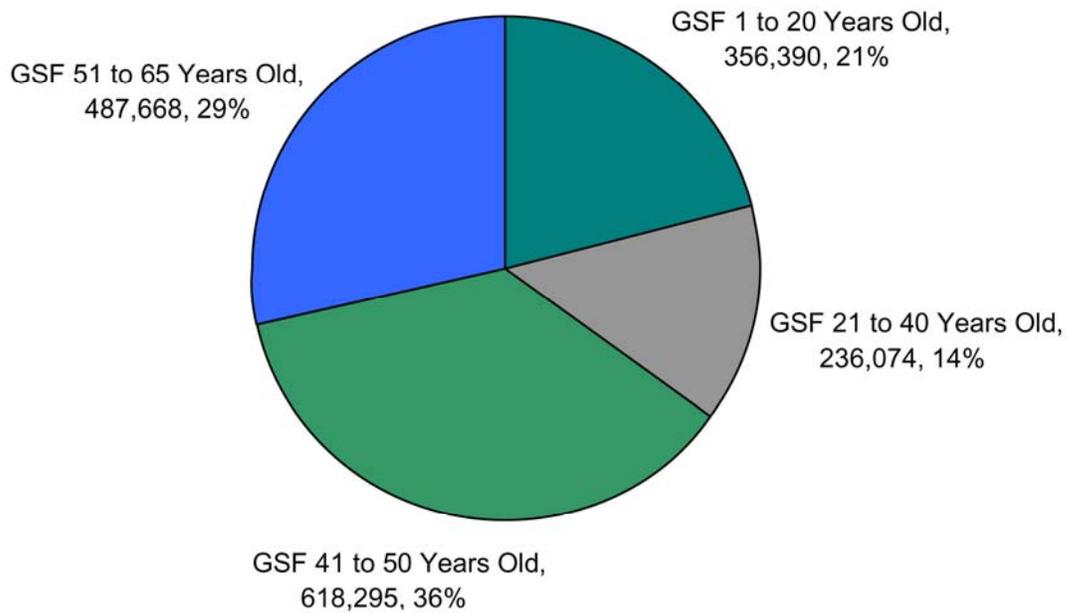


Figure 2. Age of LBNL Building Space.

Note: Does not include the Molecular Foundry

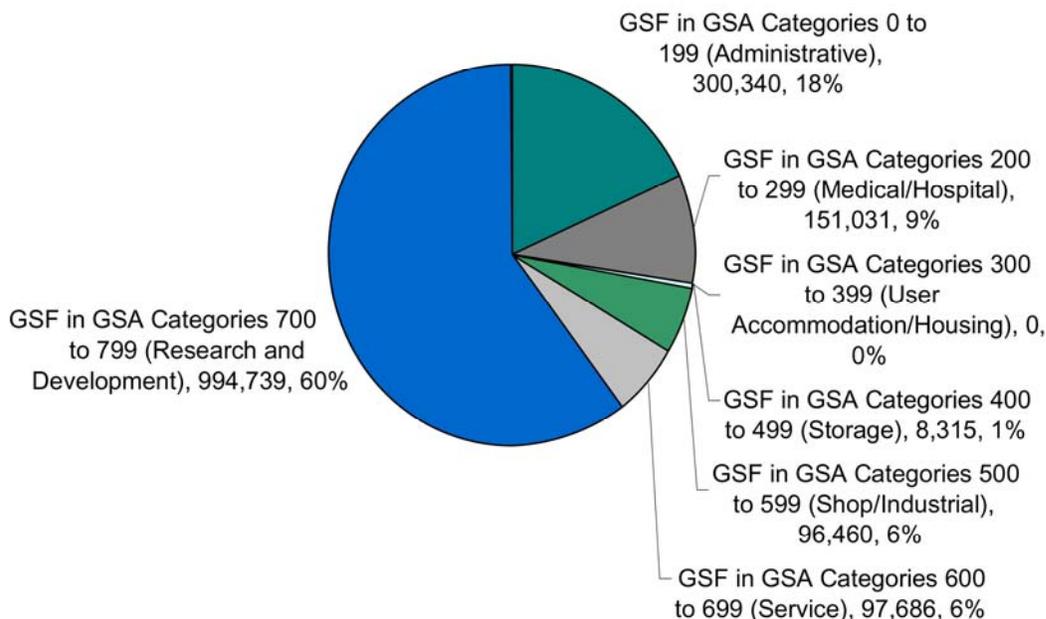


Figure 3. Space Distribution by GSA Use Code.

Note: Does not include the Molecular Foundry

C. Current and Future Missions

LBNL research is primarily oriented in support of DOE's 2006 Strategic Plan Themes of Scientific Discovery and Innovation, Energy Security and Environmental Responsibility. The laboratory has some targeted unclassified research in Nuclear Security, related to materials security instrumentation and threat reduction.

The LBNL TYSP directly supports the Office of Science initiatives outlined in SC's Business Plan prepared for LBNL and in the *Facilities for the Future of Science: A Twenty Year Outlook* on emerging scientific facilities. The SC FY 2008 Business Plan for LBNL highlights low carbon energy supplies (the Helios initiative), and Advanced Light Source upgrade, the Supernova Acceleration Probe for the Joint Dark Energy Mission (JDEM), Optical Accelerators for the Energy Frontier, and upgrades to the and the National Energy Research Scientific Computing Center (NERSC) Upgrade. *The Facilities for the Future of Science Outlook* also includes the Supernova Acceleration Probe for the dark energy mission, an upgrade to the National Energy Research Scientific Computing Center (NERSC), an upgrade to the Advanced Light Source (ALS). The LBNL TYSP outlook also includes and supports an upgrade to the Energy Sciences Network (ESnet), a Transmission Electron Aberration-corrected Microscope (TEAM), and an Integrated Beam Experiment for inertial confinement fusion energy. LBNL also plays leading or important roles in developing and fabricating projects planned for other locations that are included in the Outlook, including a Double Beta Decay Underground Detector, Relativistic

Heavy Ion Collider upgrades, and a Rare Isotope Accelerator. The TYSP sections below describe these valuable projects and related facilities that support the Office of Science and DOE strategic plans and energy goals.

As indicated above, an emerging mission focus for DOE is to develop long-term solutions to providing carbon-neutral or low-carbon energy supplies. This is in direct support of drafts of the 2007 National Energy Policy Act, the current 2005 National Energy Policy Act goals, the 2007 DOE Strategic Plan, and the 2007 LBNL Business Plan. This includes bioenergy research that sponsored by the Office of Biological and Environmental Research, solar-based fuels research sponsored by the Office of Basic Energy Sciences, and in a Energy Biosciences Institute collaboration led by the University of California, Berkeley and largely funded by BP. These efforts build on LBNL's mission capabilities in the biomolecular sciences, in characterizing and fabricating nanostructured materials, and in understanding the complexity of physical, biological, and earth systems. The capabilities in fuel supply, energy efficiency and other scientific initiatives are well aligned to the President's American Competitiveness Initiative and the President's proposed 2008 budget for the Office of Science and DOE.

In addition, the Laboratory will continue to develop scientific approaches to the understanding and prevention of disease and its longstanding high energy physics, nuclear physics and astrophysics programs. As a DOE steward of national research infrastructure, the Laboratory also provides access to major research facilities, including the Advanced Light Source, a world center for ultraviolet and soft x-ray synchrotron-based science; the National Energy Research Scientific Computing Center, a leading DOE provider of high-performance computing capabilities for complex scientific applications; the National Center for Electron Microscopy for materials science; and the 88-Inch Cyclotron for nuclear science.

Consistent with the above vision, the TYSP is also focused to address the importance of providing safe working conditions for employees, guests and visitors. The SC Laboratory Infrastructure Modernization Initiative provides an outstanding opportunity to ensure mission readiness of seismically safe facilities, and includes replacement of seismically poor and very poor multi-program buildings which can not be cost-effectively made safe. The removal of the Bevatron, which has not been used for research for 15 years, is consistent with the effort to provide fully mission ready facilities in service to the DOE missions.

1. Program Trends and Developments Affecting Facilities

As summarized above, anticipated missions, program developments and seismic safety are driving forces for infrastructure needs and the TYSP. For example, the Laboratory will be extensively engaged in:

- A new Helios program focused on solar energy conversion for biofuels and power generation, advanced energy efficiency technologies, and climate change research
- Growing user programs in nanoscience at the Molecular Foundry
- Expanded petascale computing during the next decade
- A growing astrophysics research effort centered on exploring dark energy

- New ultrafast science research in the x-ray regime [in collaboration with the Stanford Linear Accelerator Center (SLAC) and other institutions]
- Expanded efforts in synthetic biology and cell systems regulation, including programs related to health
- New efforts in nuclear energy science that can contribute to the Global Nuclear Energy Partnership and advanced fuel cycles

The TYSP outlines the facilities required to support the DOE's Five Year Business Plan for LBNL, as well as the mission and program directions that supports DOE Strategic Plans, DOE programmatic workshops, and national priorities.

As part of this update, the TYSP looks at the legacy of past missions from as early as the 1940s and the infrastructure changes important to present and future mission requirements. Such changes, primarily driven by seismic safety but also enabling modernization, include the need to demolish less than fully capable Manhattan Project-era structures in Old Town, and to modernize seismically fair and good structures, and to deconstruct the Bevatron and Building 51.

The TYSP has determined that the Laboratory's existing substation and power switching capabilities are fully able to meet expanded demands for electric power. The Bevalac-era feeder capacity is more than adequate for planned electrical needs to sustain the ALS and its upgrades, providing for an additional Next Generation Light Source, and for the return of the NERSC facility to the main site.

The table below reflects recent and near-term evolution of mission drivers over the term of this TYSP.

Table 2. Recent and Near-term Evolution of Mission Drivers.

Period	New and Expanding Sciences	New Experimental and Research Facilities	Infrastructure Needs/Development
2000–2010	Nanomaterials; genomics; advanced computing; astrophysics; 3rd and 4th generation electron storage rings and instrument engineering; new materials and x-ray science; understood genomes; dark energy discovered; neutrino oscillations	ALS; NERSC; Genome Sciences Laboratory; ALS User Support Building; Molecular Foundry; TEAM 0.5 and 1.0 Microscope Facilities	Deconstruction of the Bevatron; seismic safety upgrades and replacement space; demolition of seismically unsafe legacy accelerator at Bldg. 71 and of legacy Special Use/Purpose buildings in Old Town; modernized laboratories and support spaces; select mechanical utility upgrades and replacements
2010–2020	Ultrafast science and petascale computing, solar energy conversion, advanced bio-energy, and photochemical conversion, synthetic biology and cell systems regulation, global climate change research, nuclear energy science	ALS continuing upgrades and a complementary Next Generation Light Source, Helios Facility (UC financing), SNAP, Computational Research and Theory Facility (UC financing), Life Sciences space	Final seismic safety upgrades, modernized laboratories and support spaces, select mechanical utility upgrades and replacements, utility modernization and upgrades.

2. Projected Program Funding and Population Growth

Consistent with the National Competitiveness Initiative, LBNL will probably have a projected funding growth nearly five percent annually over the next seven years (2006–2012). Each year, the Laboratory will fully serve a “user” population of more than 4,000 scientists at its national user facilities, including those for the growing research communities in soft x-ray science, computing, electron microscopy, and genomics. ALS users will benefit from top-off mode and undulator replacements, which will substantially improve coherence, and spatial and spectral resolution. Computational scientists will benefit from a doubling of the high-end capacity of NERSC to over 800 peak teraflops per second in the next decade, allowing advances in the critical DOE mission areas of energy, environment, and advanced technology. A Helios research program, emphasizing solar to chemical energy conversion, will be initiated to address the great challenge of providing secure fuels that are low carbon or carbon neutral, essential to the nation’s economic and international security. Health research and environmental remediation will be advanced through a detailed understanding of molecular machinery and predictive modeling systems that will provide designed microbial and plant systems for DOE missions. Carbon sequestration will be demonstrated. The Supernova/Acceleration Probe (SNAP) will be launched in 2014 to reveal the nature of dark energy. The development of new commercial building systems control technology will benefit the nation’s energy security.

These activities and their associated facilities needs are described in the program summary provided below. This summary reflects the implementation of these prospective research developments and is discussed in more detail in the narrative that follows. Significant progress

on improved infrastructure can be achieved, including seismic-safety upgrades to buildings, during the first two decades of this century. The Laboratory population grows at lower rate than the projected funding due to equipment and fabrication activities associated with programs in computing, astrophysics and other areas.

Table 3. Summary of Expected Program Funding (Excluding Construction) and Staffing.

Funding Source	Fiscal Year (Constant Year \$M)												
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
SC–BES	90	94	118	135	145	150	150	150	160	160	160	160	160
SC–HEP	39	43	48	50	52	58	58	58	58	58	58	58	58
SC–BER	71	71	76	80	80	91	94	94	94	94	94	94	94
SC–NP	18	17	19	19	20	22	22	23	23	23	23	23	23
SC–ASCR	78	69	78	80	80	102	102	102	102	102	102	102	97
SC–Fusion	6	5	5	6	6	9	12	12	12	12	12	12	12
SC–Other	6	9	9	9	9	9	9	9	9	9	9	9	9
Total SC	308	308	353	379	397	461	447	448	458	458	458	458	458
Other DOE	59	58	54	50	50	55	65	76	76	76	76	76	76
Work for Others & Hmlnd Sec.	115	120	113	120	127	134	134	134	134	134	134	134	134
Total Funding	483	486	520	548	573	630	646	658	668	668	668	668	668
Total Staffing (FTEs)	3,140	3,130	3,250	3,350	3,450	3,550	3,580	3,610	3,630	3,630	3,630	3,630	3,630

3. Advanced Scientific Computing for DOE Research Programs

Computation at the largest scales possible will be increasingly important to advance the scientific frontiers in every Office of Science (SC) program. Working in close conjunction with SC, LBNL will provide the facilities for dramatic advances in computational power at NERSC, high bandwidth and reliability with ESnet, and the development of powerful mathematical and software tools.

These efforts will also fulfill SC's high priority for the NERSC and ESnet upgrades in the *Facilities for the Future of Science* roadmap. LBNL's thrust in computing is to serve the growing SC and national computational science community to deliver new scientific results through expanded capacity and network bandwidth. LBNL's mathematics, computer science, and computational science programs will provide seminal advances for the Office of Advanced Scientific Computing Research (ASCR) and will contribute to important applications for other SC programs. In particular, through the development and deployment of algorithms, software, and tools, LBNL researchers funded under the SciDAC program will enhance the productivity of computational scientists, assure the more efficient utilization of terascale platforms, and enhance collaborations across the DOE complex. Therefore, the construction of a Computational Research and Theory Facility through University of California financing is essential for the implementation of these programs.

Table 4. Advanced Scientific Computing: Current Research, Trends, and Facilities Needs.

Program Area	Current Research	Trends/New Directions	Facilities Needs
NERSC	Provide leading scientific computing capability and support for DOE science	Increase computing capability by 10- to 100-fold (petaflop/s computing) for the next-generation simulation science	Existing off-site facility is inadequate to support upgrades after 2010; location is inefficient and less secure than optimal
Computational Research	Develop mathematical tools and algorithms for science applications. Scientific Discovery through Advanced Computing (SciDAC)	Development and evolution of stable tools that can be ported to different computing environments	Consolidation in Computational Research and Theory Facility needed
Energy Sciences Network (ESnet)	Provide high bandwidth and reliability for SC's networking needs.	Expand bandwidth, backbones, and metropolitan area networks; build grid.	Consolidation in Computational Research and Theory Facility needed

4. Basic Energy Sciences

LBNL is refocusing its strengths to address the pressing national and global needs for sustainable, carbon-neutral or zero-carbon energy and fuels production. This strategy's aim is to yield radical improvements over the long term in the efficiency of solar to energy conversion to fuels and electricity. To advance this goal, LBNL is proposing the Helios Project, which will pursue several paths to the solar-to-fuels and electricity solution:

- (1) biological approaches, especially the application of genomics and microbial science to convert cellulose to liquid fuels;
- (2) the creation of new inorganic nano-particle devices for the collection and conversion of sunlight directly into electrically as well into fuel production; and
- (3) the synthesis of biological and inorganic components to create hybrid devices that produce fuels.

In order to achieve these objectives, a Helios research facility is needed to provide state-of-the-art laboratories for multidisciplinary experimental physics, chemistry, biology, and engineering integrated with special facilities for computational and theoretical studies. The facility will be located in close proximity to LBNL's Material Sciences buildings (Buildings 62 and 66) and the Molecular Foundry, and will allow both flexibility and expansion. Because of the need for diverse fuel supplies, the Laboratory will continue to conduct research on increasing domestic fossil-fuel production, methane gas hydrate characterization, and nuclear waste disposal, areas that are also underpinned by the DOE/SC Basic Energy Sciences Program (BES) geosciences program.

The photon and electron probes and materials research centers supported by the Office of Science are among the nation's most powerful science tools. Two thousand scientists use the Advanced Light Source (ALS) annually; the demand will continue beyond the time horizon of the TYSP. To further meet growing user demands, LBNL is committed to keeping the ALS at the leading edge of performance. To remain at the cutting edge in high-resolution spectroscopy and x-ray microscopy, and to exploit coherence, the ALS is being upgraded for continuous electron-current fill of the storage ring ("top off mode"). The top-off mode will enable science currently not possible; high demand is expected once the capability is delivered. Further improvements will address user demands for the coming decade. However, the most critical current need is for staging areas and space for users. To this end, the User Support Building is essential for continued programmatic success at the ALS. It also replaces the seismically "very poor" Building 10. The Laboratory will be constructing the LBNL Guest House with alternative financing to support the growing ALS user community as well as users of other LBNL facilities.

A complementary Next Generation Light Source is in the early planning stages. This will provide a source of intense, high-repetition rate, ultra-short pulse length, soft x-rays for advancing the frontiers of ultrafast science and high-resolution studies. Research and development will be conducted for such a machine over the next five years. Several Laboratory locations are possible sites for the facility, with options being narrowed as performance specifications become more defined.

The Molecular Foundry has been constructed at LBNL and now serves a growing base of nanoscience investigators. Work at the facility will serve the DOE community as well as a range of non-DOE sponsoring agencies and industries. The external scientists will benefit from the development of new tools and scientific capabilities at the facility, including methods for the synthesis, characterization, and design of organic and inorganic nanomaterial building blocks; they will also benefit from new capabilities for developing integrated assemblies of organic and inorganic molecular nano-components. New nanodevices and materials will be developed by these users, including materials for electrochemical, photovoltaic, electronic, optical, and other systems in demand by the nation's technology-based economy.

The Transmission Electron Aberration-corrected Microscope (TEAM) will overcome resolution limitations present in existing electron microscopes. This is a top-tier priority for the SC *Facilities for the Future of Science* roadmap and a national technology need. TEAM is being developed as a collaborative project of the five BES electron beam microcharacterization facilities. Led by LBNL, TEAM will overcome limitations posed by current lens aberration to achieve 0.5 angstrom resolution in real-time with various contrast-imaging techniques. The prototype TEAM "0.5" instrument is on track for commissioning in FY 2008, and the TEAM 1.0 instrument is planned for commissioning in FY 2009 or 2010. Each instrument will be installed within an existing instrument silo of the National Center for Electron Microscopy. GPP investments are upgrading electrical, structural, and climate control systems in the silos. A seismic upgrade of NCEM is also in progress.

The Basic Energy Sciences Program supports basic research in the geosciences that underpins DOE's goal to deliver solutions to growing problems in CO₂ sequestration, fossil energy and climate change, geothermal energy, and nuclear energy. Focused field, laboratory, and modeling research will develop the techniques and methodologies to better delineate subsurface fluid flow paths and reactions and engineer the geochemical and microbiological processes. The effort will increase understanding of earth and atmospheric processes by combining new knowledge gained at the atomic–molecular level with conceptual and computational advances for simulating large-scale processes in order to predict, protect, and better use critical natural resources. Geoscientists use many facilities at LBNL, including the ALS, electron microscopes, and NERSC. Laboratories need to be consolidated near offices, and improvements and expansion of laboratories are needed over the next ten years.

Table 5. Basic Energy Sciences: Current Research, Trends, and Facilities Needs.

Program Area	Current Research	Trends/New Directions	Facilities Needs
Basic Science for Solar Energy	Photochemistry; understood and engineered chemical reaction processes; catalysis	Efficient solar to chemical energy systems; hydrogen storage and catalytic systems	Modernization of laboratory spaces; Helios Research Facility (UC financing)
Vacuum Ultraviolet (VUV), Soft X-Ray, and Ultrafast Sciences	Provide VUV, soft, and intermediate x-ray probes for science and technology (ALS); provide systems for synchronized photon pulses at LCLS and other sources	Explore femtosecond and attosecond science in atomic, molecular, and optical phenomena	Modernization of laboratory spaces; ALS upgrades; complementary Next Generation Light Source with high rep rate, ultrashort pulses and high resolution
Nanoscience	Provide the characterization, synthesis, and theoretical capabilities to advance nanoscience for both organic and inorganic nanodevices	Synthesize hybrid nanodevices; develop tailored materials and devices with unique catalytic, electronic, structural, and optical performance	Modernization of laboratory spaces; Molecular Foundry; TEAM
Geosciences	Understood coupled transport process; reservoir delineation; geochemistry; geophysics; isotope geochemistry	Carbon sequestration strategies; interrelationships among impacts, from local to global level	Improvements to laboratories; replacement of the rock physics laboratory following Bevatron deconstruction
Basic Energy Sciences User Facilities	Advanced Light Source; National Center for Electron Microscopy; Molecular Foundry	Expanding user population	LBNL Guest House; User Support Building

5. Biological and Environmental Research

Multidisciplinary biology—at the interface of physical, life, and computational sciences—promises tremendous value for the nation. There is a growing demand to reveal the molecular mechanisms of living systems' adaptations and responses to their environment, and to use microbes and plants to provide a new basis for fuels production. DOE support for a new Joint BioEnergy Institute is expected to grow beginning in FY 2008, ushering in a new era of research on the production of cellulosic biofuels. JBEI research will largely be conducted in new leased laboratories in the adjacent City of Emeryville

Genome sequencing serves an expanding user base. Sixty percent of the Joint Genome Institute's (JGI) sequencing capacity (now at over three billion base pairs per month) is being made available to the scientific community through the Community Sequencing Program. The revolutionary advances in biological imaging science can be coupled to other new genomics tools for structural and functional characterization and modeling. The effort will contribute to the new science for designing the machinery, synthetic vesicles, and microorganisms capable of sensing and reporting on the environment, capturing energy, and producing new materials.

LBNL's environmental research programs will continue to address the major challenges of global climate change and environmental restoration. Environmental monitoring and analysis focuses on atmospheric, terrestrial, and subsurface processes, such as measuring and modeling climate change, the development of instrumentation to study carbon cycling, and the prediction of water and contaminant transport in the subsurface. LBNL's climate change research is directed to improve climate change predictions at global to regional scales and to understand the potential impacts of climate change for ecological and social systems. Understanding the pathways of climate forcing is well coupled to Helios research to reduce climate forcing. Many of the tools and approaches that are developed for environmental applications are also relevant for energy exploration and management. LBNL will continue to play a central role in DOE's effort to sequester carbon and remediate legacy waste. As a major component in one of DOE's seven regional centers for CO₂ sequestration, LBNL will provide a broad-based effort in terrestrial and geologic sequestration. Many of the observational and experimental programs are conducted offsite, and some locally leased greenhouses support this program.

Table 6. Biological and Environmental Research: Current Research, Trends, and Facilities Needs.

Program Area	Current Research	Trends/New Directions	Facilities Needs
Biofuels Production	FY 2007 work limited to genome and microbial work as summarized below	New Joint BioEnergy Institute created for a systematic attack on feedstocks, deconstruction, and fuels synthesis	Leased space near LBNL. Programs will utilize some existing resources (JGI, ALS) and the future UC Helios Building
Microbial Science	Understand microbial proteomes, physiomes organisms, and communities	Tailored microbial communities for energy and remediation	Modernization of laboratory spaces

Program Area	Current Research	Trends/New Directions	Facilities Needs
Genome Sequencing	Production genome sequencing and targeting microorganisms and other organisms of energy and environmental significance	Comparative genome sequencing for DOE applications; community sequencing and ecogenomics	Modernization of laboratory spaces; existing leased JGI facility is adequate
Biological Imaging	Optical microscopy; geochemistry; geophysics; hydrology; crystallographic imaging; single particle imaging	Novel tools for imaging system dynamics on multiple length and time scales; x-ray tomography	Modernization and Seismic Safety of laboratory spaces
Global Climate Change	Measure and model climate change and climate forcing,, terrestrial carbon processes, aerosols, ecosystem response, and the carbon cycle; develop Earth system models.	Develop models that couple carbon and water flux through the earth system from local to global scale	Modernization of laboratory spaces; additional research office space will be needed for the growing LBNL program
Carbon Sequestration	Develop sequestration strategies; LBNL is one of seven national CO ₂ sequestration centers	Safely demonstrate carbon sequestration	Modernization of laboratory spaces; additional research office space will be needed for the growing LBNL program
Remediation Science	Understand biogeochemical transformation and remediation at contaminated sites	Sustainable, cost-effective, in situ remediation approaches integrated real-time tracking of biogeochemical processes	Existing labs satisfactory; consolidate location of offices with labs
Low-dose Radiation	Understand low-dose radiation effects and DNA damage responses	Monitor populations; define susceptibility; modulate and intervene in exposure risk	Modernization and Seismic Safety of laboratory spaces. Consolidation of research units.

6. High Energy Physics

LBNL expects to be a leader for the Office of High Energy Physics in accelerator and space-based experimental programs. The discovery that the expansion of the universe is accelerating marks a major scientific revolution. LBNL is leading this effort with a SuperNova/Acceleration Probe (SNAP) proposal to measure dark energy by observing distant Type Ia supernovae spectra with a highly instrumented orbiting telescope. SNAP is a top priority of the SC *Facilities for the Future of Science* roadmap. The effort will require sustained engineering labs and expanded office space.

The next generation of accelerator-based research will open an era in which laboratory experiments shed light on some of the most profound mysteries of the universe. Supersymmetric particles will likely be discovered at the Large Hadron Collider, and precision studies of their properties will be a major focus of the International Linear Collider program (ILC). A continuing program in advanced detectors and computing infrastructure is crucial for these programs. Advanced accelerator technology will need continuous development to build and fully exploit the capability of these machines. The Laboratory will be active in the development of the Linear Collider in the mid term and of the Super Neutrino Beam in the far term. LBNL will continue to be the leader in superconducting magnet design, particularly in the area of addressing development of materials required for high-field magnets. LBNL will also advance ion beam technology by studying sources and front-end structures, neutron generators, nanofabrication, and plasma and ion beam tools. It will be important to sustain the laboratories essential to this superconducting magnet and ion source work as Old Town is deconstructed.

LBNL's demonstrated use of laser-accelerated beams having a narrow energy spread in fields of ~ 100 GeV/m promises extremely high energy beams with short accelerator structures. The Laboratory has demonstrated centimeter-scale plasma structures that accelerate high-quality beams up to GeV energies, and is now working on a multi-GeV system. Compact, high energy beam sources already offer a new paradigm for a national user facility. The Mesoscale Laser User Facility will advance the scientific frontiers across the Office of Science in high energy density physics, in structural and dynamic studies with femtosecond hard x-rays and electron beam probes and, ultimately, in revolutionary prospects for multi-TeV high energy physics.

Table 7. High Energy Physics: Current Research, Trends, and Facilities Needs.

Program Area	Current Research	Trends/New Directions	Facilities Needs
SuperNova Acceleration Probe(SNAP)/Joint Dark Energy Mission (JDEM)	Understand the nature of dark energy and dark matter; measure the properties of dark energy	Satellite launched in the next decade to increase the discovery rate for supernovae; give experimental measurements of cosmological parameters	Modernization of laboratory spaces; expand office space; maintain detector and electronics labs, clean rooms, and assembly areas
Next-generation Accelerator-Based Science	Detectors and experiments to search for the origin of particle mass at the LHC; search for supersymmetry	Precision studies of supersymmetric particles at the ILC	Modernization of laboratory spaces; maintenance of detector and electronics laboratories. Consolidation of detector research units.
Laser Accelerators	Gigavolt acceleration achieved; demonstrate multi-centimeter-scale plasma structures that accelerate high quality beams to multi-GeV energies	Develop longer tandem couple plasma structures; achieve teravolt beams	Rehabilitate Southeastern portion of Building 71 to support laser, detector, and accelerator development work and provide seismic safety

7. Nuclear Physics

LBNL will continue to be a leader in several key aspects of nuclear physics, with a focus on nuclear structure, quark-gluon matter, and nuclear astrophysics. Over the next two decades, our programs will reveal the nature of the nucleon and nucleonic matter, including the evolution and properties of the quark-gluon plasma, the structure of stable nuclei and those at the limits of stability, and the properties of neutrinos. While the overall level of the research program will be relatively constant, LBNL efforts at the Rare Isotope Accelerator (RIA), Double Beta Decay, and the e-RHIC detectors, all of which are in the Office of Science *Facilities for the Future* plan, will grow. In addition, stable 88-Inch Cyclotron operation, with modifications, will sustain the program during the ten years of this site plan.

LBNL will sustain its leadership in non-accelerator-based nuclear physics, including the development of neutrino experiments worldwide and the double beta decay experiments planned in the United States. The Double Beta Decay Underground Detector experiments for understanding neutrino physics are a mid-term priority in SC plans and a key part of the National Science Foundation (NSF) initiative to build a deep underground laboratory.

The Department of Defense (DOD) and the Office of Nuclear Physics have expressed a commitment to support nuclear physics and space radiation simulation testing at LBNL's 88-Inch Cyclotron through at least the mid-term of this TYSP. The Cyclotron provides a valuable low-energy nuclear physics machine in the short term, and can form the basis of a cost-effective Stable Beams Facility in the RIA era. The facility has the capabilities for light and heavy-ion

beams, high-intensity heavy-ion beams, and cocktail beams for efficiently simulating the space radiation environment. The facility is also installing a neutron beamline that will contribute data on isotope neutron cross sections important to the Global Nuclear Energy Partnership and Advanced Nuclear Fuel Cycle studies.

Table 8. Nuclear Physics: Current Research, Trends, and Facilities Needs.

Program Area	Current Research	Trends/New Directions	Facilities Needs
Nuclear Matter	Understanding nuclear matter under extreme conditions	Explore the properties of short-lived isotopes	Modernization of laboratory spaces; rare isotopes facilities (located elsewhere)
Quark Gluon Plasma Studies	Understanding phase transitions of nuclear matter at extremely high temperatures	Explore new phases of nuclear matter at the highest achievable temperatures and pressures	Modernization of laboratory spaces; Relativistic Heavy Ion Collider and its upgrades (located elsewhere)
Neutrino Science (some projects sponsored by High Energy Physics)	Understanding properties of neutrinos and their impact on the cosmos	Determine the absolute mass scale of neutrinos; search for evidence of charge parity (CP) violation in lepton sector	Modernization of laboratory spaces; Underground research lab (NSF) for double beta decay; experiments at Daya Bay (with HEP)
Low Energy Nuclear Research at the 88-Inch Cyclotron	Low energy nuclear physics, nuclear structure, and space radiation simulation for DOE	Stable isotopes facility consistent with the Nuclear Physics Long Range Plans; support nuclear energy through neutron cross sections	Modernization of laboratory spaces; sustained infrastructure for the 88-Inch Cyclotron consistent with current scope and potential stable isotope facility

8. Fusion Energy Sciences

Berkley Lab is developing a strong high energy density physics research program, and the Heavy Ion Fusion Virtual National Laboratory collaboration is advancing inertial fusion energy research based on heavy ion drivers. Additionally, LBNL's capabilities in diagnostic neutral beams and niobium-tin (Nb₃Sn) magnets can support the success of a magnetic confinement research program at the International Thermonuclear Experimental Reactor (ITER). Both of these programs will contribute to the success of SC's Fusion Energy Sciences research program.

Heavy ions are excellent for studying high energy density physics by uniformly heating thin target plasmas with peak energy deposited in a location near the target center. The primary challenge for exploiting these properties when creating high energy density matter and fusion ignition conditions is to compress the beam's time to short durations compared to the target disassembly time, while also focusing on a small spot to deposit high energy density. LBNL will pursue these challenges with an objective of establishing the physics basis for a heavy-ion accelerator capable of producing 1 to 10 eV solid density plasmas with uniformity and diagnostic resolution to discriminate the predictions of various *ab initio* theories for strongly coupled plasmas. For the next five years, the overall trend in Fusion Energy Sciences supported research is expected to be stable, with most research in the Building 58 vicinity requiring modest upgrade and/or extensions to the existing building as the size of experimental facilities dictates. Suitable alternative sites for the Integrated Beam Experiment (IBX) which is included in the SC *Facilities for the Future of Science* roadmap, are being identified.,.

Table 9. Fusion Energy Sciences: Current Research, Trends, and Facilities Needs.

Program Area	Current Research	Trends/New Directions	Facilities Needs
Ion Beams and Magnet Systems	Ion-beam driven high energy density physics	A user facility for studies of warm dense matter	Consolidation of research units. Demolition of Old Town.
Heavy Ion Drivers	Heavy ion inertial fusion energy drivers (AFRD)	Development of a robust, cost-efficient, ion-based fusion driver	Seismic Upgrade and Modernization of Building 58

9. Science and Engineering Workforce

LBNL provides for the education and training of future scientists, computer scientists, and engineers to meet the DOE mission. Each year, more than 1,000 employees, including postdoctoral associates and graduate and undergraduate students, are educated and trained through mentored research participation. Precollege programs promote careers in science and technology through summer work opportunities for high-school juniors and seniors and science teachers. The Office of Science supports undergraduate student and faculty fellowships. Programs include the Student Undergraduate Laboratory Internship, the Community College Institute, a Preservice Teacher Program, and Faculty and Student Teams. LBNL recruits students from minority-serving institutions to increase representation of underrepresented minorities in science and engineering in the national applicant pool. Education partnerships and outreach focus on local schools and colleges, ensuring the participation of a diverse population of students. The LBNL Guest House will greatly aid visiting graduate students and postdoctoral associates in their access to LBNL facilities.

Table 10. Science and Engineering Workforce: Current Program, Trends, and Facilities Impact.

Program Area	Current Activities	Trends/New Directions	Facilities Impact
Office of Science and DOE	Undergraduate research internships and pre-service teacher training	Expanded efforts to build science pipeline	New location for program due to ALS space requirements and Old Town deconstruction
Other Federal Agencies, Industry	Training graduate students and postdoctoral associates	New training in nanoscience and synthetic biology, etc.	LBNL Guest House (UC-funded facility)

10. DOE Energy Technology Research Programs

LBNL also has a leadership role in understanding nuclear waste disposal and the enhanced exploration of resources that are critical for securing a viable near-term energy future, including oil, gas, and geothermal. The Laboratory is well positioned to make substantial contributions to U.S. domestic production capacity through its leading role in geophysical imaging technology and its many existing research and development relationships with domestic producers. LBNL leads a national effort in nuclear waste site characterization at Yucca Mountain, and also plays a leadership role in exploring chemical reactivity and mechanisms in gas-phase combustion, homogeneous and heterogeneous catalysis, chemical and physical processes in the earth, and the environmental degradation of radioactive compounds.

Table 11. DOE Energy Technology Research Programs: Current Research, Trends, and Facilities Needs.

Program Area	Current Research	Trends/New Directions	Facilities Needs
Civilian Radioactive Waste Management	LBNL leads studies of the vadose zone where waste will be implaced at Yucca Mountain	Characterize other sites; assess alternative advanced fuel cycle wastes	Colocate offices with labs
Energy Efficiency and Renewable Energy	Lighting and control systems; commercial building systems; understood international energy issues; solutions to global carbon emissions	Integrated building control systems for high efficiency; energy efficiency assistance to China and developing nations	Colocate related research units.
Electricity Reliability	Robust electricity transmission and distribution; power quality to meet customer needs	Demand response to reduce electric load in commercial buildings and industry	Research office building improvements
Fossil Energy	Understood and engineered chemical reaction processes; understood local, regional, and global impacts of fossil fuel combustion	Improved petroleum discovery and recovery; hydrogen storage and catalytic systems; interrelationships among impacts, from local to global level; carbon sequestration	Seismic Safety upgrades and Renovations and upgrades needed in chemistry labs; office building improvements

11. Homeland Security and the National Nuclear Security Administration

LBNL will use its specialized scientific and engineering capabilities to conduct unclassified research for homeland security and defense. Some of the science the Laboratory will offer for this national need includes aerosol transport modeling, compact neutron sources for noninvasive container inspection, environmental characterization for threat agents, forensics and diagnostic analysis, structural biology of microbes, advanced information technology for cyber-security, infrastructure protection, and ultra-sensitive detectors. The Laboratory is identifying, synthesizing, and testing new detector and scintillator materials using first principles materials sciences, quantum science, and dedicated facilities. Such detectors will be essential for identifying contraband nuclear materials in transit.

Table 12. Homeland Security and NNSA: Current Research, Trends, and Facilities Needs.

Program Area	Current Program	Trends	Facilities needs
Detector Systems for Security and Nonproliferation	Develop neutron probes, sensors, gamma ray, and charge particle detectors for security applications	High-sensitivity sensors for rapid detection of threat agents, including nuclear and biomaterials	Consolidation of detector research units. Rehabilitate portions of Building 71 to support laser, detector and accelerator development work, including ion beam/neutron beam test stands.

12. Work for Others (WFO)

Non-DOE sponsored research at LBNL complements DOE's mission and strengthens distinguishing competencies. The largest sponsor is the National Institutes of Health (NIH) for research in cancer biology, genomic expression, structural biology, DNA repair, and diagnostic imaging. NIH support will continue to grow, building on LBNL expertise in biophysics, genome sciences, and instrumentation such as x-ray tomography and crystallography beamlines at the ALS. The Department of Defense will continue to sponsor breast cancer research, the use of particle beams to simulate the space radiation, and detector development and computational research. LBNL conducts space radiation effects studies, astrophysical research, and detector development for the National Aeronautics and Space Administration (NASA). LBNL will maintain research for the California Energy Commission, the Environmental Protection Agency, and other federal and state agencies, universities and the private sector. Universities also support research at LBNL, with a growth area in biofuels research and for a Deep Underground Science and Engineering Laboratory (DUSEL). Some of the WFO biofuels research will be conducted in a Helios Laboratory to be constructed by the University adjacent to the Molecular Foundry and the National Center for Electron Microscopy. The DUSEL R&D will be conducted within existing space, largely in engineering. Although the amount of WFO funding will increase, as a share of LBNL research activity, WFO will be stable (in the range of 20–21% of operating and equipment funding). LBNL conducts instrumentation development and threat reduction research for the Department of Homeland Security and is tabulated with WFO per TYSP guidance.

Table 13. Work for Others: Current Research, Trends, and Facilities Needs.

Program Area	Current Program	Trends	Facilities needs
NIH	Develop molecular, cellular, and tissue models of disease; cancer biology; genomic expression; structural biology; DNA repair; and diagnostic imaging	Quantitative understanding of disease causes and prevention; high-throughput analysis; paradigms for genetic variation	No specific special requirements.
Other Work for Others	Breast cancer (DOD); environmental science; energy efficiency (EPA); astrophysics (NASA, universities), state; private	Joint Dark Energy Mission with NASA has largest potential for rapid growth.	No specific special requirements.

Table 14. Summary of Ten-Year Programmatic Facilities.

Project	Size and Waiver Status	Demolition Needs	FIMS Date; RPV & Maintenance Need	Site Impacts*
User Support Building	30,000 gsf/waiver approved	Building 10	2010	Parking to be provided adjacent to building
Transmission Electron Aberration-corrected Microscopes 0.5 & 1.0 (TEAM)	Existing building	None	—	New walkways connecting to new Helios building.
ALS upgrades	Existing building	None	—	None
Helios Research Facility	160,000 gsf	None	Nonfederal financing	Vehicle Circulation/access and parking to be provided close to building. New walkways.
Computational Research and Theory Facility	90,000 gross square feet	None	Nonfederal financing	Parking lot to be added close to building; some added utility runs
Next Generation Light Source (NGLS)	150,000 gsf/ Waiver if Bevatron and/or other demolition projects are delayed	TBD	2013	Parking lot to be added close to building; possible site excavation depending on location
AFRD consolidation adjacent to Integrated Beam Experiment	Existing building	Remove Hilac	—	None
LBNL Guest House	24,000 gsf	None	Nonfederal financing	Extend cafeteria hours/services

* Staffing; office space, cafeteria, machine shops; utility capacity; traffic and parking.

D. Facilities and Infrastructure

1. Vision, Goals and Strategy (VGS) for Facilities and Infrastructure (F&I)

LBNL is a DOE Office of Science facility that is recognized world-wide for its research success, actions, and vision. LBNL serves, and will continue to serve the DOE Office of Science mission with a continuing tradition of scientific excellence. The Laboratory is unique among the Office of Science Laboratories, being home to eleven Nobel prize winners, and the work of its scientists and engineers has been recognized with numerous other awards and prizes. LBNL is a world-class facility that is uniquely qualified and situated to achieve seminal breakthroughs with DOE's scientific missions in the early 21st Century.

The DOE research mission is accomplished within, and is dependent upon, the facilities and infrastructure of the LBNL site. As modern science requires exacting operating standards and as LBNL is home to numerous user facilities hosting many qualified researchers from other laboratories, universities, and industry, the safety, performance and capabilities of the Laboratory's mission-critical facilities and infrastructure are closely monitored and managed.

Vision

LBNL will provide facilities and infrastructure which effectively meet the requirements of the DOE research programs.

Goals

LBNL vigorously concurs with DOE that the general support infrastructure of the Laboratory must be adequate to accommodate SC's programmatic mission activities. It is critical that safe facilities which are well matched to modern research requirements be readily available to address current missions and changing research requirements and technologies. LBNL supports DOE SC's vision that the general support infrastructure must provide:

- **A Safe and Secure Environment:** The laboratory's facilities and infrastructure must provide a safe, healthy, and secure working environment for employees and visitors.

In addition, they must protect the environment of neighboring communities.

Retired facilities, such as the Bevatron, must be removed quickly to avoid the costs and negative impacts resulting from accumulating legacy issues and site development and directly related research inefficiencies.

- **A Productive Working Environment:** Modern facilities that provide a satisfactory working environment for researchers are essential.

Modern facilities directly support the efficiencies and productivity that facilitates research excellence, and are critical in attracting and retaining the world-class researchers who will produce the breakthrough required to meet DOE mission goals.

Activities and organizations that need to be co-located, will be, in order to achieve the communication and interreaction necessary to ground-breaking and productive science.

New and Modernized facilities must be designed so they not only meet current mission requirements, but are also readily adaptable to changing SC-wide research requirements and technologies.

The Laboratory must provide both a modern communications and information infrastructure, and lab-wide engineering and shop capabilities which are appropriate to modern research.

Use of off-site leased space is to be restricted to research activities which benefit from off-site locations, and to operations functions which are not made less effective.

Excess facilities will be closed and operations consolidated with other facilities.

Moreover, the infrastructure must be maintained in a manner that minimizes impacts on research programs.

- **Efficient Operations and Maintenance:** Buildings and infrastructure must be efficient to operate and maintain.

Energy efficient and sustainable building and utility systems must be employed to provide cost-effective operations.

Strategy and Action Plan for FY2009-2018

This TYSP proposes a strategy and action plan that is focused to achieve the following four Strategic Objectives, and an action plan aligned with these objectives that will achieve the preceding Goals:

I. Correct Seismic Life-Safety Hazards

Seismic Life Safety evaluations have now been completed for 87% of the Laboratory's Hill-site and Donner Laboratory space (1.558M GSF of a total 1.796M GSF). The final surveys of the primary buildings will be completed in FY 2007, and evaluations of trailers and smaller structures are planned to be completed in FY 2008. LBNL is applying the University of California Seismic Safety criteria for Life Safety, under this system buildings are assigned one of four ratings:

GOOD	Some structural and non-structural damage, life safety not <i>significantly</i> jeopardized
FAIR	Structural and non-structural damage represent <i>low</i> life hazards
POOR	Significant structural and non-structural damage represent <i>significant</i> life hazards

VERY POOR Extensive structural and non-structural damage represent *extensive* life hazards

For the most part, buildings at LBNL are safe, however roughly one-third of the building space has identified seismic life safety deficiencies. Specifically, fifty three percent (53%) of LBNL's Hill Site and Donner Lab building space (~944K GSF) has been identified as Fair or Good using the University of California rating system. Thirty-four percent (34%) or ~614K GSF, has been identified as Poor or Very Poor, and require life safety upgrades to their structural systems, or replacement where upgrades can not be cost-effectively achieved. Of the unevaluated buildings, the remaining 51K GSF of occupied conventional buildings will be surveyed in FY2007, and the 188K GSF of trailers and small structures will be evaluated in FY2008.

A program to achieve seismic life safety in the approximately 1/3 of buildings that are identified to have seismic life safety deficiencies has been developed. Deficient general purpose and institutional facilities have been prioritized and integrated into the DOE Office of Science's Infrastructure Modernization Initiative. To ensure these buildings are fully capable of meeting mission performance objectives, necessary modernization work will be performed concurrent with the structural upgrade work. This approach will both minimize disruptions to the research programs and efficiently apply the limited resources. Seismic life safety deficiencies in Programmatic buildings are being addressed with support from the appropriate DOE Office of Science Program Offices.

Within the SC Infrastructure Modernization Initiative, LBNL has identified a series of four SLI Line Item Projects which together will address the structural Seismic Safety issues that have been identified in multi-program and institutional buildings. Consistent with the vision of the SC Infrastructure Modernization Initiative, buildings to be seismically upgraded, or replaced when upgrades can not be cost-effectively accomplished, will concurrently be modernized to provide fully suitable and mission ready facilities. The current FY2007 SLI LIP and the four SC Infrastructure Modernization Initiative projects are outlined below. Per TYSP Guidance, these projects are summarized in greater detail Appendix 5

Table 15. SC SLI Line Item Projects.

Ref.	Project	Start	TEC	Scope Summary
n.a	Seismic Life Safety Phs. 1	FY2007	\$18M	Seismic safety upgrade of two general-purpose research buildings (Buildings 50 and 74)
1(a)	Seismic Safety of General Purpose Buildings, Phs 2	FY2009	\$97M	Replace 43K GSF seismically and functionally inadequate building space; Upgrade the HWHF (Building 85), Modernize Building 74 while it is vacate for the Seismic upgrade (project above);
1(b)	Seismic Safety of General Purpose Buildings, Phs 3	FY2011	\$91M	Replace 35K GSF of seismically and functionally inadequate building space; Seismically upgrade and modernize the LBNL medial facility (Building 26), the Dining facility (Building 54), and the Facilities shops (Building 76).
2	Seismic Safety of Building 70	FY2013	\$84M	Seismically Upgrade and Modernize a major laboratory building (Building 70)
3	Seismic Safety of Vintage Structures	FY2015	\$138M	Replace 43K GSF of seismically and functionally inadequate building space; seismically upgrade and modernize two general-purpose research buildings (Buildings 25A and 46).

Note: TEC's are mid-point of construction

II. Modernize Fundamentally Sound but Older Research Facilities and Replace those which can not be Cost-effectively Modernized

Facilities which are rated seismically Poor or very Poor will be addressed under the SC SLI funding program. The modernization requirements of the other older general purpose research facilities will be accomplished in concert with the SC Infrastructure Modernization Initiative by the Laboratory through a combination of Maintenance investments, Laboratory-funded upgrades, and upgrades to be accomplished under the Office of Science SC Infrastructure Modernization Initiative.

A program to modernize approximately 1/5 of LBNL's buildings in order to ensure these older research facilities can continue to meet mission objectives is being developed. Older general purpose research facilities were constructed to codes and standards that pre-date current rigorous research methods and building performance expectations. Current and emerging research requirements are the foundation of this modernization initiative.

LBNL has identified the general purpose research buildings which are seismically fine, but require modernization. As LBNL and SC have prioritized buildings with Seismic Safety issues for funding under the SC Infrastructure Modernization Initiative, LBNL funds will be used to address the modernization requirements of these other buildings. LBNL will match modernization requirements with the appropriate Federal funding category, applying IGPP, IOP and Maintenance funds to achieve the desired objective. It is important to note that this approach is now possible as the SC Modernization Initiative is sharing in the overall modernization, and LBNL is able to move out of a triage-oriented funding framework to strategically address the requirements of these buildings. This program will be developed in 2007-2008 for implementation in FY 2009.

Examples of the work to be performed under this Strategy, include; increasing chiller and chilled water supply capabilities in Building 2 to accommodate modern research equipment, separating supply air systems in Buildings 70 and 70A to accommodate additional fume hoods and research instruments, modernization of the 1960's-era laboratories of Building 62 with replacement benches, hoods, utilities, lighting and finishes, and modernization of electrical switch gear and panels to ensure adequate clean power

III. Support Office of Science Vision for Facilities for the Future of Science

Lawrence Berkeley National Laboratory fully supports the Office of Science initiatives outlined in SC's Business Plan prepared for LBNL and in the *Facilities for the Future of Science: A Twenty Year Outlook* on emerging scientific facilities. The SC FY 2008 Business Plan for LBNL highlights low carbon energy supplies (the Helios initiative), and Advanced Light Source upgrade, the Supernova Acceleration Probe for the Joint Dark Energy Mission (JDEM), Optical Accelerators for the Energy Frontier, and the National Energy Research Scientific Computing Center (NERSC) Upgrade. *The Facilities for the Future of Science* outlook also includes the Supernova Acceleration Probe for the dark energy mission, an upgrade to the National Energy Research Scientific Computing Center (NERSC), an upgrade to the Advanced Light Source (ALS). The LBNL TYSP outlook also supports the upgrade to the Energy Sciences Network (ESnet), the Transmission Electron Electron Aberration-corrected Microscope (TEAM) initiative, and an Integrated Beam Exp inertial confinement fusion energy.

LBNL maintains its focus to the SC Facilities for the Future of Science initiative. LBNL has met all objectives and responsibilities to date. LBNL's Business Plan provides is updated with DOE annually, and the Business Plan is used as an input to the TYSP.

IV. Construct new Non-Federal Science Facilities

Lawrence Berkeley National Laboratory works with the Office of Science to construct Non-Federal facilities which support achievement of the mission. LBNL is working to construct three third-party/Non-federal facilities at its Hill Site. These buildings will provide on-site overnight accommodations to visiting researchers to the National User Facilities (which typically operate 24-hours a day), a new computational research and theory facility, and a new Helios Research facility.

2. Process for Identifying F&I Needs and Development of Plans

The Laboratory leadership actively participated in the preparation of LBNLs proposal for the SC SLI Infrastructure Modernization Initiative. This action builds upon annual process that update the Business Plan, and assesses the capabilities of the buildings and infrastructure both with a regular survey of the physical condition of each asset (five-year cycle), and with an annual needs assessment involving all Divisions and the Laboratory leadership. These processes are drawn together in an annual Project Prioritization process involving all Division Directors and the Laboratory leadership. This annual Project Prioritization process includes consideration of Maintenance and Deferred Maintenance, Non-Capital Alteration, GPP, IGPP and GPE requirements. The Laboratory's Seismic Safety Evaluations, CAS, and VFA survey results as well as staff input regarding particular needs, are all utilized in this process. The Associate Laboratory Directors for Computing, General Sciences, Life and Environmental Sciences, Physical Sciences, and Operations have taken an active role in assessing facilities needs and the use of space within their respective units. Berkeley Site Office staff is engaged in the above processes.

3. Land Use Plan

Within the University of California system, each campus and Laboratory periodically prepares a Long Range Development Plan (LRDP) to guide the general future physical development of the facility. The LRDP identifies a construction "envelope" to accommodate the general physical development needed to enable the Laboratory to achieve its scientific objectives during a planning period of approximately two decades. LBNL's LRDP was recently updated and was approved by the Regents of the University of California in July 2007. The LRDP can be accessed at <http://www.lbl.gov/LRDP/>.

The LRDP provides a growth envelope that accommodates all anticipated development, allowing for an additional 612,000 gsf of net new building space (replacement gsf are not included in this figure) at the LBNL site through its planning horizon of 2025. The growth envelope of the LRDP includes both DOE and DOE authorized Non-Federal buildings at the LBNL site. The LRDP also allows flexibility in use of space on the UCB Campus, allowing for up to 100,000 sf to be used by LBNL programs, and for off-site leased space if and as required (to a maximum of 338,000 gsf).

The Laboratory's Land Use Map, and a map showing LBNL buildings and utilities, are attached in Appendices 1 – 3.

4. Utilization and Excess Real Property

The Department's Three Year Rolling Timeline ((TYRT) identifies Asset Utilization Index (AUI) targets by year for various types of facilities. LBNL, with its Asset Utilization Index of 0.96, fully conforms to both the current and long-term objectives of this guidance for all applicable categories (Office, Laboratory and Warehouse).

Asset Utilization Index (AUI) Targets ¹									
Performance Measure		Baseline		Target				Achieve Target	Comments
		FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	Long Term		
Asset Utilization Index	Office	94.93%	92.39%	93.00%	93.50%	94.00%	95.00%	2011	Excludes Closure Sites. ¹ Closure sites Include: Mound, Fernald, Rocky Flats, Ashtabula, and Weldon Springs
	Warehouse	88.90%	88.06%	88.00%	88.50%	88.50%	89.00%	2010	
	Laboratory	89.08%	89.62%	85.00%	86.00%	87.00%	90.00%	2012	
	Hospital	86.06%	87.19%	87.00%	87.50%	88.00%	90.00%	2012	
	Housing	99.59%	99.67%	99.00%	99.00%	99.00%	99.00%	2006	

¹ Closure sites are removed from AUI metrics because the management decision to dispose of the site has been made, the site is under decontamination and demolition which takes years, and the sites are no longer in our active inventory.

Due to the high rate of asset utilization at LBNL (96%), buildings are typically formally identified as excess in the year they are to be demolished (typically as replacement space is developed). At this time, the Bevatron and the associated Building 51 structure are the Laboratory's major excess facility, and the highest priority for demolition.

Consistent DOE operating funding is at the base of the Laboratory's efforts to remove surplus/excess facilities. These are facilities that were:

1. Constructed to serve missions no longer supported by the DOE and that are not cost effective or suitable for full adaptive reuse, or,
2. Have been condemned and abandoned in place pending demolition.

The mission of the Bevatron and Building 51 ended in 1993 with the last experimental run. The building accounts for 7.5% of the built space at the Laboratory, and it occupies over 4 acres (126,500 gsf) of centrally located, flat real estate in the hilly terrain of LBNL. The abandoned Bevatron accelerator cannot be adaptively reused and should be removed.

The resulting Bevatron Redevelopment Area will provide a 4.4 acre development site for modern new buildings. This site would then be productively used to meet DOE's emerging scientific missions.

Demolition of the Bevatron is a funded, multi-year DOE SC SLI project. Final demolition action is planned for FY2011.

While demolition of the Bevatron is the primary focus of excess facility removal at LBNL, there are a number of small structures, most abandoned and condemned, which will also be demolished by the Laboratory during the early years of this TYSP. In addition, the Laboratory has examined the long-term viability of the older buildings, and under the SC Infrastructure Modernization Initiative proposes to replace and demolish structures which can not effectively serve the mission in the future.

5. Long-Term Stewardship

Long-term environmental surveillance activities are being performed under the requirements of the Resource Conservation and Recovery Act (RCRA). On July 13, 2007, the California Department of Toxic Substances Control approved LBNL's RCRA Corrective Action Implementation Report, which describes soil and groundwater remedies required for the site. The soil remedies have already been completed; however, seven groundwater plumes will be monitored and/or treated until risk-based media cleanup standards are achieved

6. Replacement Plant Value (RPV) Estimates

The RPV used for FY2009 planning is \$804,959,682. Inclusion of recently developed "Site Factors" will increase the RPV figure to \$950M in FY2010, and a projected RPV of \$1,156M in FY 2018.

LBNL's Replacement Plant Value (RPV) cost models have been developed by Vanderweil Facility Advisors (VFA) and reported to the Department of Energy (DOE) Facilities Information Management System (FIMS) as a Site Derived RPV-

The 2007 TYSP RPV Projections table on the next page is LBNL's estimate of RPVs for "active operational conventional" facilities for FY 2009 through FY 2018. Included in the table are additions from new and forecasted facilities, eliminations for future demolition targeted facilities, and conventional cost escalation factors.

Table 16. RPV Projections.

	A RPV of existing facilities at beginning of FY	B Estimated Additions in FY	C Total Estimated RPV at end of FY (Column A + Column B)	D Escalation (1.023 * Column C)
FY04	\$650,000,000	NA	NA	NA
FY05	\$650,000,000	NA	NA	NA
FY06	\$656,912,215			\$804,959,682
FY 07	\$804,959,682	\$123,720,920	\$928,680,602	\$950,040,255
FY 08	\$950,040,255		\$950,040,255	\$971,891,181
FY 09	\$971,891,181		\$971,891,181	\$994,244,679
FY 10	\$994,244,679		\$994,244,679	\$1,017,112,306
FY 11	\$1,017,112,306	\$21,843,837	\$1,038,956,143	\$1,062,852,134
FY 12	\$1,062,852,134	\$8,779,097	\$1,071,631,231	\$1,096,278,749
FY 13	\$1,096,278,749		\$1,096,278,749	\$1,121,493,160
FY 14	\$1,121,493,160	-\$16,448,031	\$1,105,045,129	\$1,130,461,167
FY 15	\$1,130,461,167		\$1,130,461,167	\$1,156,461,774
FY 16	\$1,156,461,774		\$1,156,461,774	\$1,183,060,395
FY 17	\$1,183,060,395	\$50,000,000	\$1,233,060,395	\$1,261,420,784
FY 18	\$1,261,420,784	-\$2,878,775	\$1,258,542,009	\$1,287,488,475

7. Maintenance

LBNL intends to continue to adequately maintain all research and support facilities, in alignment with research mission expectations. The Table below provides an illustrative funding projection for maintenance relative to the Replacement Plant Value of the site.

To support management decision making and project tracking, LBNL has implemented a Strategic, Integrated Facilities Condition Management Program. This program is allowing the Facilities Division to manage maintenance decision making using current accurate data, and to monitor and address the Laboratory's deferred maintenance backlog efficiently and effectively. LBNL has contracted with the nationally recognized maintenance management firm VFA. Through use of VFA's software, including VFA facility and AssetFusion VFA's integration with MAXIMO, the Facilities Division Work Management System, LBNL gains access to versatile and extensive capabilities for maintenance tracking, reporting and modeling, and gains an ability to improve the accuracy of building cost estimates, estimating time to failure and optimal period to take action, and improve the overall utility and quality of the information gathered.

Maintenance project candidates are reviewed during an annual project planning process. They are reviewed considering a number of factors, including mission impact, current and future uses, criticality of the system or unit, timing, availability of funds, and impact on facility condition and deferred maintenance over time. The current condition of the asset and the consequences of failure are assessed to determine the planning year of the project.

During the early years of this TYSP, LBNL expects to achieve further process improvements and efficiencies by utilizing Reliability Centered Maintenance (RCM) methods including Failure Modes Effects and Criticality Analysis (FMECA) processes. RCM is a systematic way of identifying failure modes within equipment and determining appropriate maintenance tasks to combat the failures. This approach, when coupled with data regarding plant failures, costs, safety impacts, environmental impacts, and operational criticality, will allow Facilities Plant Operations to set appropriate tasks and maintenance intervals to generate a strategy that is optimized to the needs of Laboratory business.

LBNL uses MAXIMO as its Work Management System (WMS). Preventive, predictive, corrective, and emergency maintenance work is managed using MAXIMO to keep Laboratory equipment running efficiently.

For a completely integrated Asset Management Solution, links between LBNL's Work Management System (MAXIMO) and Capital Planning and Management System (VFA facility) will be established to provide a more complete picture of associated projected and actual cost for routine/preventive maintenance, repair, capital renewal, and multiyear capital requirements. This tool is expected to achieve additional efficiencies as it can be used to organize and prioritize all deficiency corrective measures using standardized criteria.

Table 17. Laboratory Maintenance Funding Plan.

A RPV (with Revised SF)	B SC Goal Maintenance Based on 2% of RPV using RPV estimate in D.6	C Planned Site Direct Funded Maintenance in FY	D Planned Indirect Funded Maintenance in FY	E Total Planned Site Maintenance Funding (Column C + Column D)	F MII Calculation (E as a % of A)	G Explanation if Funding Plan does not meet goal or results in deferred maintenance
\$650,000,000	\$13,000,000		\$13,000,000	\$13,000,000	2%	
\$656,912,215	\$13,138,000		\$13,138,000	\$13,138,000	2%	
\$804,959,682	\$16,099,194		\$16,099,194	\$16,099,194	2%	
\$950,040,255	\$19,000,805		\$19,000,805	\$19,000,805	2%	
\$971,891,181	\$19,437,824		\$19,437,824	\$19,437,824	2%	
\$994,244,679	\$19,884,894		\$19,884,894	\$19,884,894	2%	
\$1,017,112,306	\$20,342,246		\$20,342,246	\$20,342,246	2%	
\$1,062,852,134	\$21,257,043		\$21,257,043	\$21,257,043	2%	
\$1,096,278,749	\$21,925,575		\$21,925,575	\$21,925,575	2%	
\$1,121,493,160	\$22,429,863		\$22,429,863	\$22,429,863	2%	
\$1,261,420,784	\$25,228,416		\$25,228,416	\$25,228,416	2%	

8. Deferred Maintenance Reduction (DMR)

Deferred Maintenance backlog is a tabulation of maintenance actions and replacements that were not completed when they would optimally or typically have been completed and are deferred to the future. The Asset Condition Index (ACI) is used to assess overall status of Deferred Maintenance. The DOE has set ACI goals by Mission Dependency category as shown below:

DOE Asset Condition Index (ACI) Targets									
Performance Measures		Baseline		Target				Achieve Target	Comments
		FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	Long Term		
Asset Condition Index	Mission Critical	NA	0.959	0.960	0.962	0.964	0.980	2017	
	Mission Dependent	NA	0.945	0.946	0.947	0.948	0.950	2017	
	Not-Mission Dependent	NA	0.961 ¹	0.950	0.900	0.850	0.850	2017	Operating assets only.
Asset Condition Index Department -Wide		0.94	0.957	0.958	0.959	0.960	0.965	2017	All mission critical, mission dependent, and operating not mission dependent assets.
<small>We report deferred maintenance for only safety, health and environmental deficiencies for assets in a shutdown mode (FASAB #6 assumes operating assets). Therefore, many of the shutdown assets have zero deferred maintenance and including them would improperly inflate the ACI of</small>									

Through a combination of replacement and modernization scope in the SC Infrastructure Modernization Initiative, DMR, IGPP, and Non-capital Alteration projects, and Demolitions, LBNL intends to pursue these goals. LBNL projects DMR funding along as outlined in the following table.

The Deferred Maintenance backlog is identified through the five-year cycle Condition Assessment Inspection process and by in-house experts, then prioritized, reviewed, and planned based on funding. DMR growth, funding and escalation figures are listed in the following table, along with the associated impact on ACI.

Table 18. DMR.

FY	A DM Estimated Start of FY	B Estimate of DM Growth	C SC DMR Funding Target (from the Table in Section II, B.2. DMR)	D Lab Planned DM Reduction Funding	E Portion of Column D from IGPP, SLI, or Major Repairs	F DM Reduction: Other Contributions (Line Item Projects) (ESPCs)	G Expected DM at the end of the Fiscal Year (A+B)-(D+F)	H DM Escalation= (DM in Column H * 1.0235)	I Estimated RPV	J Estimated ACI (use estimated DM from G and estimated RPV from J {ACI = (1-[J/L])})	DOE ACI Target	DOE Asset Type	FY DOE-MII Funding Applied
FY 05			NA	NA				\$52,882,301	\$650,000,000			All Assets	FY 07
								\$51,295,832				Buildings	
								\$126,918				Trailers	
								\$1,586,469				OSF	
FY 06	\$52,882,301		NA	\$2,000,000				\$51,903,453	\$656,912,215			All Assets	FY 08
								\$50,274,152				Buildings	
								\$125,851				Trailers	
								\$1,503,450				OSF	
FY 07	\$51,903,453	\$3,663,000	\$2,178,000	\$2,201,000	\$23,000		\$53,365,453	\$54,619,541	\$804,959,682	0.93		All Assets	FY 09
								\$51,895,002				Buildings	
								\$131,087				Trailers	
								\$4,176,422				OSF	
FY 08	\$54,619,541	\$1,092,391	\$6,068,962	\$6,068,962	\$3,000,000		\$46,642,970	\$47,739,080	\$950,040,255	0.95		All Assets	FY 10
								\$44,063,171				Buildings	
								\$124,122				Trailers	
								\$3,532,692				OSF	
FY 09	\$47,739,080	\$954,782	\$8,850,569	* \$7,000,000	\$3,700,000		\$37,993,861	\$38,886,717	\$971,891,181	0.960	0.96	All Assets	FY 11
								\$35,892,440				Buildings	
								\$101,105				Trailers	
								\$2,877,617				OSF	
FY 10	\$38,886,717	\$777,734	\$11,632,117	\$4,236,000	\$4,236,000		\$31,192,451	\$31,925,474	\$994,244,679	0.968	0.964	All Assets	FY 12
								\$29,467,213				Buildings	
								\$83,006				Trailers	
								\$2,362,485				OSF	
FY 11	\$31,925,474	\$638,509	Continue as needed	\$7,700,000	\$7,700,000		\$17,163,984	\$17,567,337	\$1,017,112,306	0.983	0.975	All Assets	FY 13
								\$16,214,652				Buildings	
								\$45,675				Trailers	
								\$1,299,983				OSF	
FY 12	\$17,567,337	\$351,347	Continue as needed	\$2,575,000	\$2,575,000		\$12,768,684	\$13,068,748	\$1,062,852,134	0.988		All Assets	FY 14
								\$12,062,454				Buildings	
								\$33,979				Trailers	
								\$967,087				OSF	
FY 13	\$13,068,748	\$261,375	Continue as needed	\$5,128,000	\$5,128,000		\$3,074,123	\$3,146,365	\$1,096,278,749	0.997		All Assets	FY 15
								\$2,904,095				Buildings	
								\$8,181				Trailers	
								\$232,831				OSF	
FY 14	\$3,146,365	\$62,927	Continue as needed				\$3,209,292	\$3,284,710	\$1,121,493,160	0.997		All Assets	FY 16
								\$3,031,788				Buildings	
								\$8,540				Trailers	
								\$243,069				OSF	
FY 15	\$3,284,710	\$65,694	Continue as needed				\$3,350,405	\$3,429,139	\$1,130,461,167	0.997		All Assets	FY 17
FY 16	\$3,429,139	\$68,583	Continue as needed				\$3,497,722	\$3,579,918	\$1,156,461,774	0.997		All Assets	FY 18
FY 17	\$3,579,918	\$71,598	Continue as needed				\$3,651,517	\$3,737,327	\$1,183,060,395	1.00		All Assets	FY 19

* ACI Target of 0.960 Reached

Assumptions

- Column B - Assumes 2% Backlog Deterioration
- Column B - Assumes a MII funding investment of 2% RPV
- Column E - Assumes \$39,803,000 in DM Reductions from IGPP, SLI, or Major Repairs
- Column H - Assumes 2.35% Labor & Material Escalation

ACI Ratings

ACI targets based upon 84% mission critical and 16% other (mission dependent and not mission dependent)

9. Recapitalization and Modernization

Overview

Over the past two decades, international monitoring data regarding seismic events and from structures that sustained damage in seismic events have been combined with new computer modeling capabilities to dramatically advance our knowledge of the performance of buildings and infrastructure during seismic events. This breakthrough knowledge has been vetted and validated and has dramatically transformed the fields of structural and seismic engineering.

LBNL has worked with DOE BSO to retain leading experts in these fields to survey the seismic safety of buildings at the Laboratory site. As anticipated, a number of the structures that were built using the anecdotally based engineering design principles of earlier decades show some serious flaws—structural flaws that will allow *some* buildings to partially or fully collapse, or otherwise pose life safety risks.

The Laboratory is in the process of completing a seismic safety assessment of all buildings. Those buildings where risks were perceived to be higher are being surveyed first under this program, this engineering survey process will be completed in 2007.

Requirements

The Laboratory has

- (a.) moved staff and programs from the “very poor” problem buildings by doubling-up staff and programs in the Laboratory’s already highly utilized space;;
- (b.) moved staff and programs from the “very poor” problem buildings by locating programs in off-site lease space when on-site building space could not be cost – effectively upgraded;
- (c) identified those seismically “poor” and “very poor” buildings that can be cost-effectively upgraded to provide continued safe mission-critical service;
- (d) identified those seismically “poor” and “very poor” buildings that cannot be cost-effectively upgraded and are now slated for demolition when replacement mission-critical space is constructed; and;
- (e) worked with the SC Program offices to address issues in Programmatic space.
- (f.) applied Alteration and GPP funds where they could be effectively used to address safety problems, and,
- (g.) worked with SC to fund removal of an abandoned accelerator which poses seismic risks to a building, and,

(h.) worked with DOE BSO to begin to initiate an upgrade and building replacement program that will eliminate the safety risks in a measured expeditious manner.

Approximately 30% of building space at LBNL is older than 51 years. The DOE Real Property Asset Management Order (RPAM) prescribes a program where the infrastructure of a building is maintained so as to achieve its design/effective life, and that the infrastructure of assets are recapitalized at the end of that nominal effective life. The infrastructure of these assets is now due (or past due) for recapitalization” (aka “modernization”) on this building space, using line item funds (for medium- to large-sized buildings) and GPP funds (for small buildings). Another ~35% of the building space at LBNL is between 41 and 50 years of age and, under the RPAM management program, will also undergo recapitalization during the term of this TYSP. Most of these buildings are medium- to large-size buildings and would require line item funding for recapitalization. The 2007 RIC figure for LBNL is: \$132,343,201

The SC Infrastructure Modernization Initiative for General Purpose Research and Institutional buildings promises to remedy a significant number of these deficiencies through replacement and modernization. In addition, LBNL is committed to address significant additional RIC requirements using IGPP, Non-Capital Alteration funds. These actions will ensure that DOE assets are fully mission capable within the term of this TYSP. LBNL has prioritized buildings with Life Safety issues to be addressed first under the SC Infrastructure Modernization Initiative, and has proposed to address the modernization of buildings that do not have Seismic Life Safety issues using IGPP, Maintenance and Institutional Operating Project (IOP) funds.

a. IGPP

Consistent with applicable DOE orders, LBNL wishes to maximize its contribution to the DOE mission by allocating its indirect dollars to provide appropriate supporting institutional infrastructure and services. In regard to its facilities, LBNL continues to invest as much indirect funding as possible to meet MII requirements, to reduce its Deferred Maintenance backlog (DMR), and to address smaller scale capital upgrade requirements using IGPP funds (and GPP funds until the SC Infrastructure Modernization program is implemented). The Laboratory has committed to increase funding of IGPP program, through efficiencies achieved under the SC Infrastructure Modernization Initiative, in order to equal the current Landlord GPP funding levels when the SC Infrastructure Modernization Initiative is implemented, and projects higher levels of IGPP funding as greater efficiencies are realized under the SC Modernization Initiative. FY2007 IGPP funding is \$500K, and projections for FY2008 are the same. The current planned funding profile for FY 2009 – FY 2018 follows:

Table 19. IGPP Plan.

Planned IGPP Funding Profile (\$K) figures include anticipated \$500K of annual IOP spending											
FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20
\$4,100	\$4,100	\$4,500	\$5,500	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000

Notes: Projected FY2009 funding exceeds Landlord GPP funding in current and recent years (\$4.065K). Figures include funds to be spent for demolitions to support the SC Modernization Initiative.

b. Line-Item Projects

Seismic and Structural Safety of Buildings and Infrastructure, Phase I

Unacceptably high life-safety risks have been identified in recent seismic safety evaluations of Buildings 50 and 74. These buildings are occupied by over 300 personnel in the Life Sciences Division, Nuclear Science Division, Physics Division and Laboratory Administration. Relocation of personnel to life-safe space is not possible because of Berkeley Lab's critical space shortage. This project will correct the following structural deficiencies:

Building 50. Reduces unacceptably high seismic demand capacity ratios in concrete spandrel beams and shear walls, reinforces a column supporting a discontinuous shear wall, and rehabilitates inadequately anchored nonstructural elements.

Building 74. Strengthens vertical bracing, eliminates an inadequate seismic gap, resolves diaphragm discontinuities and a discontinuous shear wall, and retrofits a compromised shear wall.

This project is a FY2007 start, its funding profile is presented in the IFI Crosscut Attachment.

Seismic Safety of General Purpose Buildings, Phase 2

TEC – \$97M (mid-point of construction)

Deferred Maintenance Reduced: \$6.957M

Rehabilitation and Improvement Costs (RIC) Reduced: \$39M

CAMP: 76.2 RPM: 292

Unacceptably high seismic life safety risks are corrected in general-purpose research and lab-wide resource buildings. While some of the smaller buildings and the trailers have yet to be surveyed, based on previous surveys it is anticipated most will be poor.

The seismic safety risks to be addressed in this project are in general purpose research facilities and a lab-wide resource, the Hazardous Waste Handling Facility.

This project will:

Replace seismically poor and deficient buildings that can not be cost-effectively upgraded

- One replacement research laboratory/office building is constructed (43,000 gsf)
 - o Multi-program, general-use conventional research building (70% research laboratory and 30% research office)
 - o Relocate and consolidate staff and programs in safe and more functionally efficient building - allowing for efficiencies and consolidation.
- Three buildings and five trailers are demolished. (43,060 gsf)
 - o Bldgs. 25, 25B, 55 Trailers 71C, 71D, 71G, 71J, 71P

An additional 12,172 gsf of DOE buildings are demolished concurrently by LBNL, and ~36,000 gsf of DOE footprint off-site leased space is vacated when the new building is completed.

Total net reduction in the DOE footprint is 48,232 gsf.

Upgrade and modernize seismically poor buildings which can be cost-effectively improved to safely address modern mission needs.

- Bldg. 85, the Hazardous Waste Handling Facility (HWHF), a 15,405 gsf building; the project will:
 - o install a subsurface retention system to ensure ancient landslide deposits under the HWHF remain stable during a major earthquake.
 - o seismically upgrade first story sheer walls and other lateral force systems.
- Bldg. 74, a 45-years old, 45,382 gsf general-purpose research laboratory/office building, and the project will:
 - o upgrade the building systems to meet modern research expectations while the programs and staff are relocated for a concurrent seismic upgrade of the building.

Note: Laboratory Operating funds will be committed to support the SC Modernization Initiative in order to demolish:

Four buildings and four trailers (12,172 gsf)

- o Bldgs. 55A, 56, 60, 63
- o Trailers. 90C & 71F, K, Q

This project is a FY2009 start, its funding profile is presented in the IFI Crosscut Attachment.

To correct the remaining buildings with seismic safety and modernization deficiencies, LBNL proposes three additional Line Item projects under the SC Infrastructure Modernization Initiative, which is summarized in Appendix 5

c. General Plant Projects

GPP funds are provided by SC Program Offices. In the case of LBNL, this is the “landlord” High Energy Physics program (HEP). Funding determinations are made just prior to the beginning of the fiscal year, and reflect the most current information regarding the status of competing priorities across a number of categories. With implementation of the SC Modernization Initiative in FY2009, the Landlord GPP funding programs for Multi-program Laboratories (including LBNL) will be eliminated, and replaced by a Laboratory funded IGPP program. Projected FY2008 projects and funding are identified in the IFI Crosscut in the Appendix.

In conformance with federal accounting standards, LBNL applies GPP funds to address five fundamental capital project needs and address:

Seismic safety upgrades of smaller deficient buildings

Modernization of 15 to 60 year old wet and dry research laboratory spaces so they are fully useable by any SC program

Infrastructure modernization and upgrades

Adaptive-reuse conversions of space, building additions and replacement structures needed to serve DOE missions

Special commitments to DOE SC in direct support of the Facilities for the Future of Science initiative

Table 20. SC GPP Funding Guidance (\$K).

	FY05	FY06	FY07	FY08	FY09	FY10	FY11
LBNL	\$5,465	\$4,065	\$4,065	\$4,535	\$0	\$0	\$0

FY2008 funding is per DOE SC guidance for preparation of TYSP. FY2009 and out years assume SC SLI Initiative is implemented in FY2009, and the Laboratory’s commitment to convert to IGPP takes place in that year.

10. Space Bank Analysis

Beginning with FY 2003, the Department is required by Congress to offset construction of new space with the elimination of an equivalent amount of excess space. To comply with this requirement, SC maintains a Space Bank, which tracks the amount of space to be constructed and eliminated at SC sites, and all SC-funded construction projects, must have an equivalent amount of excess space allocated from this bank. The maintenance of this bank requires timely identification of planned construction and elimination of excess facilities.

LBNL plans projects in line with the construction offset policy. LBNL's plan is to "Bank" demolished space sufficient to support the new project starts described in this document as well as pre-conceptual programmatic facilities in the early stages of discussion with DOE. The following table summarizes the outlook.

Table 21. Space Bank Plan .

Year	Expected Additions (SF)	Expected Removals (SF)	Net Change	Available Offsetting Space at the Site (sf)
FY05		80,167	80,167	141,450
FY06	95,692	2,988	-92,704	48,746
FY07	5,005	15,200 4,631	14,826	63,572
FY08				
FY09		1,143	1,143	64,715
FY10	30,000	4,695	-25,305	39,410
FY11		126,527 6,941 10,176 7,176 4,201 11,808 2,222	169,051	208,461
FY12		339 480	819	209,280
FY13	43,000 15,000 20,000	20,664 3,311	-54,025	155,255
FY14		19,048 2,696 3,615	25,359	180,614
FY15		29,358	29,358	209,972
FY16				
FY17	43,000	4,959	-38,041	171,931
FY18		2,787	2,787	174,718

Note: LBNL is working with SC on New Research Program facilities which will utilize the available 1:1 gsf

11. Performance Indicators and Measures

LBNL's Contract Facilities Performance Measures are included in Appendix 7. These Performance Measures cover Operational, Maintenance, Energy Management, Space Utilization, Planning, Project Management and Facility Renewal Objectives. LBNL and DOE BSO meet annually to establish Performance Indicators and Measures. Quarterly meetings are held to assess progress and new information. Performance is reviewed for Assurance, and documented each year.

12. Energy and Sustainability Management

LBNL has a multi-decade leadership history of success in both developing and implementing energy efficiency technologies. Lawrence Berkeley National Laboratory is also a leadership Department of Energy science laboratory in energy management and sustainable energy research.

With the renewed emphasis on energy management from the President and Congress, LBNL has received direction and guidance from multiple sources: DOE Order 430.2A, Federal Energy Management Program (FEMP), EPAAct2005, SC Chief Operating Officer Malosh Guidance memorandum, Presidential Executive Order (EO) 13423 and Secretary Bodman's TEAM Initiative.

The Lab's challenge is to successfully integrate the elements of these directives, prioritize against viable funding resources, and combine the state of the art energy research at the Lab to further develop its world class energy efficiency program.

To achieve this objective, LBNL is moving to implement a lab-wide Comprehensive Energy Management (CEMP) program. An initial CEMP Plan has been prepared, and the goals of this initial year are summarized in Appendix 10.

FY2007 is a transitional year in which the lab will be moving from meeting directed energy goals to setting a vision and path for enhancing energy management across divisions. The FY2007 goals are focused toward sustained compliance with regulations, and centered with Facilities energy management activities and the transitional steps necessary to move LBNL to a lab-wide, comprehensive plan. A new organizational structure to support the CEMP program will be implemented in the 2007/2008 timeframe.

The 2007 CEMP has been developed to outline specific near-term activities and goals for immediate attention, concurrent with the implementation of this organizational structure. The FY2007 CEMP energy management objectives reflect requirements posed for LBNL by the recent energy-oriented directives identified above. Accordingly, the FY2007 CEMP addresses energy use reduction, green house gas reduction, renewable energy purchases, new building construction to advanced energy standards, and advanced electronic metering to proactively track and manage energy use. Examples of FY2007 projects include implementation of an Advanced Electrical Meter initiative which will connect all meters to a central control unit and provide a "real-time" control capability, and implementation of a energy savings contract with an Energy Services Company.

In future years, as the LBNL energy plan expands to the Lab-wide Comprehensive Energy Management Plan, it is anticipated that additional internally developed initiatives will be incorporated into the CEMP. The CEMP will be updated periodically to reflect these changes and any new guidance.

The preliminary projected BTU/square foot figures for LBNL are presented below. LBNL has achieved the Target BTU/Square Foot performance objectives of FY 2007 and FY 2008 established by the 2005 Energy Policy Act, and has achieved the FY2007 objectives of EO 13423. As the following table illustrates LBNL intends to continue to achieve the energy efficiency performance objectives established under these guiding documents.

Table 22. Projected BTU/Square Foot Figures for LBNL .

Performance Measures – Buildings (Labs/Industrial)	Baseline BTU/ft ²	Actual BTU/ft ²	Target BTU/ft ²				Achieve Target
	FY 2003	FY 2006	FY 2007	FY 2008	FY 2009	Long Term	
Operating Costs - Energy Consumption (BTU/SF). 2005 Energy Policy Act. 20% reduction from 2003 baseline by 2015.	202,647	189,967	194,541	190,488	186,435	162,118	2015
Operating Costs - Energy Consumption (BTU/SF). EO 13423 3% annual reduction or 30% reduction by 2015.	202,647	189,967	195,142	189,934	182,400	141,849	2015

Note: Estimates in **BOLD** indicate target values met by FY 2006 consumption values.

13. Leasing and Third Party/Non-Federally Funded New Buildings

Leased Space

Approximately 75,000 square feet of space directly to the west of the University of California Berkeley (UCB) campus are currently leased for administrative service functions. This downtown space is served by the LBNL shuttle bus system, which provides a direct connection to the main Hill Site. The Laboratory also leases a shipping-and-receiving facility in an offsite industrial area. Materials are consolidated at this location and transported by truck to the Hill once or twice a day.

Offsite leased space houses research functions if these functions can not be accommodated on the main site due to seismic safety issues (space in buildings identified as “Very Poor” is not safe for regular occupancy) or if off-site space is dictated by the type of work to be performed — an example of the first case is the siting of a number of Life Sciences and Physical Biosciences research programs in leased space as space in Building 25 (a building rated “very poor”) can not be adapted for use by these programs, and examples of the second case are, greenhouse space for the Earth Science Division in Richmond, CA; an office for Energy and Environment program development in Washington, D.C.; the Oakland (CA) Scientific Facility, housing computing equipment and staff; and a leased telecommuting center in Livermore, CA. The Laboratory also jointly operates the Joint Genome Laboratory’s Production Genomics Facility with other DOE laboratories in Walnut Creek, CA.

At this time, the Laboratory anticipates that leases for office and laboratory space will decrease over time as personnel and programs are consolidated to the Hill-site location.

Table 23. LBNL Leased Space by Building.

Bldg. No.	Name	nsf	gsf	Lease Expiration Date
904	Warehouse, Receiving	50,995	50995	3/31/2012
913	Greenhouse	6,051 2,802	6,051 2,802	11/30/2007 8/31/08
937	Berkeley Tower	26,163	38,360	4/30/2009
943	Oakland Scientific Facility	29,285	40,179	6/30/2010
962	Wash. DC L'Enfant Plaza	2,199	4,012	9/30/2007
965	Livermore Telecommute Center	1,575	2,822	5/31/2011
977	717 Potter Street	40,894	54,000	1/31/2010

The LBNL Leased Space table above does not include the multi-Laboratory Joint Genome Institute leases. Those leases are summarized below:

Table 24. LBNL JGI Leased Space.

Bldg. No.	Name	nsf	gsf	Lease Expiration Date
100/400	Joint Genome Institute	42,274	56,990	5/31/2013
300	Joint Genome Institute		18,149	5/31/2013
500	JGI Warehouse	4,459	4,604	5/31/2013

Third Party / Non Federal Funded Construction of New Buildings

LBNL Guest House

LBNL's ALS, NCEM and Molecular Foundry are host to a growing number of users (more than 1,300 in FY 2007). Many other scientific visitors work with researchers in laboratories at other locations across the site, and although most computational scientists use NERSC Center facilities remotely, many meet with NERSC Center scientific and support staff.



These users need housing close to their research to effectively and efficiently conduct their experimental and scientific programs. Working with UCOP and UCB, LBNL has developed and obtained approvals for a UC-funded guest house facility in order to meet these visiting users' short-term housing needs. A central "Civic Center" location—close to the ALS and a short walk to NCEM,

the Molecular Foundry, and NERSC Center scientific staff—has been identified as an ideal location for the Guest House. Occupancy of this 22K GSF facility is anticipated in 2009/2010.

Computational Research and Theory Facility

The existing off-site Oakland Scientific Facility for NERSC is inadequate to support upgrades after 2010. The location is distant. A preliminary plan for a new on-site computer and office building is well underway. A site to the west of Building 70A has been identified, and preliminary approvals have been obtained, including a CD-0 for mission need and a lease-occupancy program have been approved by the Office of Science. Occupancy of this 140K GSF facility is anticipated in 2010/2011.

Helios Research Facility

In order advance research in carbon-neutral transportation fuels vital to the national interests, the University supports the development of a Helios Research Facility to provide state-of-the-art laboratories for multidisciplinary experimental physics, chemistry, biology, and engineering integrated with special facilities for theoretical studies. Included will be core instrumental facilities for, e.g., mass spectrometry, genome sequencing, and electron microscopy, as well as a variety of thoughtfully designed interaction spaces. A conceptual plan to support research in nanoscience and physics, including laboratories and associated office space, is well advanced.. The Facility will be located close to LBNL's Materials Sciences buildings (Buildings 62 and 66) and the Molecular Foundry. Occupancy of this 170K GSF facility is anticipated in 2010/2011.

14. Operating Costs for Sustainment and Operations

The Office of Management and Budget (OMB) prepared Three Year Polling Timeline identifies targets and goals for operating costs for buildings (shown in the table below). Following the OMB guidance Table is a table illustrating the preliminary projections of LBNL. Over the next year, LBNL will review and refine this data will be refined and updated for the 2008 TYSP. The calculations in the table below are based on “all buildings and trailers” at our site, including excess ones.

Table 25. OMB Targets.

Performance Measures	Baseline	Actual	Target				Achieve Target
	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Long Term	
Operating Costs-Sustainment and DM Reduction (\$/SF)	\$6.89	\$6.50	\$7.00	\$7.25	\$7.50	\$9.00	2014
Operating Costs - Operations (\$/SF) (includes grounds, janitorial, pest control, refuse, recycling and snow removal)	\$1.10	\$1.24	\$1.30	\$1.35	\$1.35	\$1.35	2008

LBNL Data and Projections (preliminary)

Operating Costs-Sustainment and DM Reduction (\$/SF)	\$6.54	\$7.57	\$7.87	\$10.25	\$12.01	\$7.05	2011
Operating Costs - Operations (\$/SF) (includes grounds, janitorial, pest control, refuse, recycling and snow removal)	\$1.63	\$1.68	\$1.68	\$1.68	\$1.68	\$1.68	2006

E. Appendices

Appendix 1 Land Use Plan

Appendix 2 Inventory and Maps of Buildings

Appendix 3 Inventory and Maps of Infrastructure/ Site Utility Systems

Appendix 4 Updated Integrated Facilities and Infrastructure (IFI) Crosscut Budget

Appendix 5 Detail Information for FY 2009 - 2018 SLI Line Items Projects (source: SC SLI Modernization Initiative Presentations)

Appendix 6 List of Excess Facilities (those officially excess and those in process)

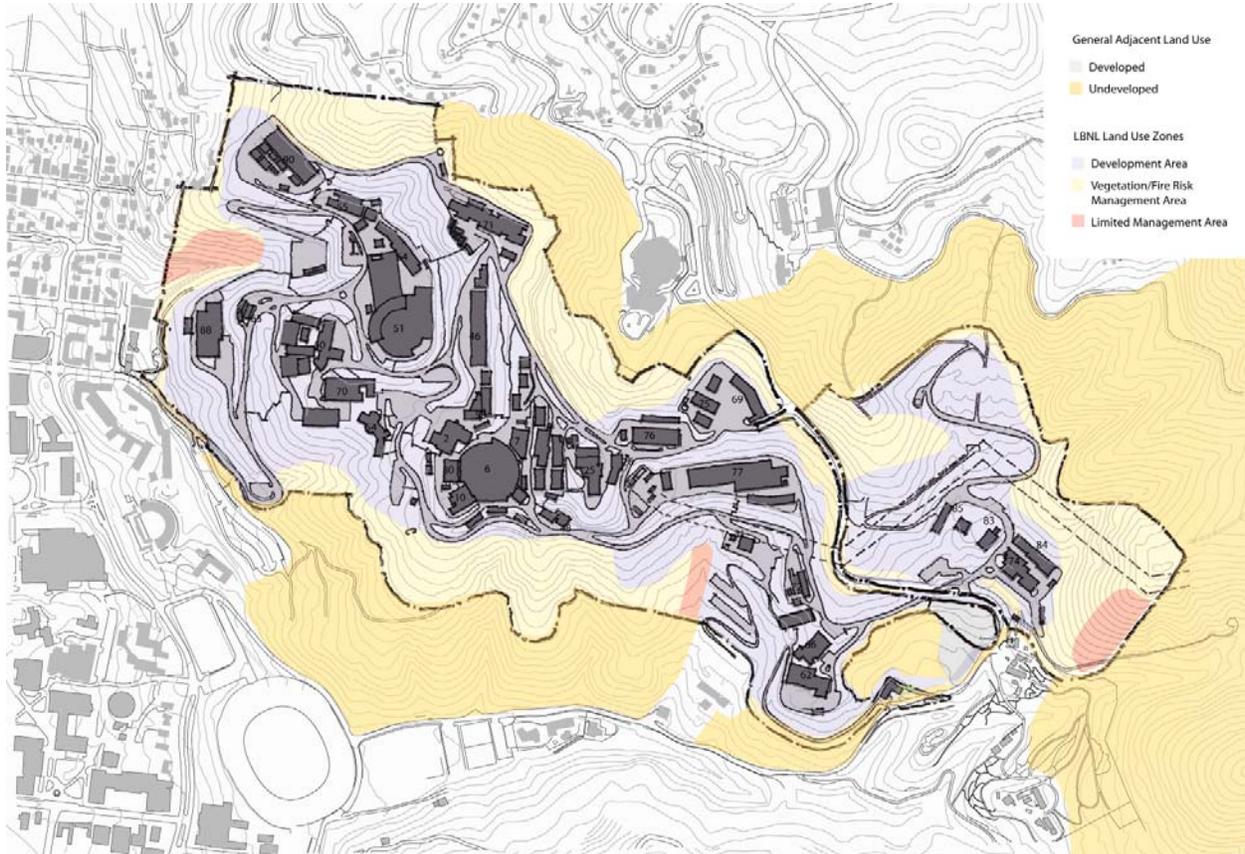
Appendix 7 FY2007 F&I Performance Measures

Appendix 8 Seismic Status of Buildings including Corrective Action Plan for Poor and Very Poor Buildings

Appendix 9 Facility Operation Measurement Factors Defined

Appendix 10 FY2007 Comprehensive Energy Management Program (CEMP) Goals

Appendix 1. Land Use Plan



Appendix 2. Inventory and Map of Buildings

Prop Type	Bldg Number	Name	Asset Type	gsf	Year Built	Status	Mission Essential	Mission Essential	% Utiliz	DM	RIC	DM+RIC =TRIC	RPV	FCI	ACI	ACI Descriptor	TSCI (TRIC/RPV)	1-TSCI	TSCI Descriptor	Excess Year	MPI - Modernization Planning Indicator	
Building	002	Laboratories & Research Offices	501	85,506	1988	Operating	1	Mission Critical	100%	344,216	1,006,075	1,350,291	\$35,880,686	1.0	99.0	EXCELLENT	3.8	96.2	GOOD	3	Continue to Operate	
Building	002A	Central Chemical Storage	501	182	1993	Operating	1	Mission Critical	100%	0	913	913	33,284	0.0	100.0	EXCELLENT	2.7	97.3	GOOD	3	Continue to Operate	
Building	004	Offices	501	10,176	1944	Operating	1	Mission Critical	100%	780,317	24,000	804,317	2,810,936	27.8	72.2	POOR	28.6	71.4	POOR	2013	2	DEMO w/o Replacement
Building	005	Laboratories & Research Offices	501	7,176	1950	Operating	1	Mission Critical	100%	572,072	14,000	586,072	2,361,332	24.2	75.8	FAIR	24.8	75.2	FAIR	2013	2	DEMO w/o Replacement
Building	006	Advanced Light Source (ALS)	501	118,573	1991	Operating	1	Mission Critical	100%	3,661,718	4,626,556	8,288,274	57,404,887	6.4	93.6	ADEQUATE	14.4	85.6	FAIR		3	Continue to Operate
Building	007	Assembly, Offices & Labs (ALS Support)	501	21,433	1943	Operating	1	Mission Critical	100%	150,149	1,443,840	1,593,989	6,454,455	2.3	97.7	GOOD	24.7	75.3	FAIR		3	Continue to Operate
Building	007A	Storage	501	128	1974	Operating	2	Mission Depend Not Critical	100%	0	5,120	5,120	2,685	0.0	100.0	EXCELLENT	190.7	-90.7	POOR		3	Continue to Operate
Building	013A	Environmental Monitoring Station	501	76	1965	Operating	2	Mission Depend Not Critical	100%	0	0	0	5,487	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	013B	Environmental Monitoring Station	501	76	1965	Operating	2	Mission Depend Not Critical	100%	0	0	0	5,487	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	013C	Environmental Monitoring Station	501	76	1965	Operating	2	Mission Depend Not Critical	100%	0	0	0	5,487	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	013D	Environmental Monitoring Station	501	76	1965	Operating	2	Mission Depend Not Critical	100%	0	0	0	5,487	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	013E	Environmental Monitoring Station	501	68	1977	Operating	2	Mission Depend Not Critical	100%	0	168	168	4,910	0.0	100.0	EXCELLENT	3.4	96.6	GOOD		3	Continue to Operate
Building	013F	Environmental Monitoring Station	501	36	1965	Operating	2	Mission Depend Not Critical	100%	0	195	195	46,328	0.0	100.0	EXCELLENT	0.4	99.6	EXCELLENT		3	Continue to Operate
Building	013H	Environmental Monitoring Station	501	90	1990	Operating	2	Mission Depend Not Critical	100%	0	222	222	6,498	0.0	100.0	EXCELLENT	3.4	96.6	GOOD		3	Continue to Operate
Building	014	Laboratory and Offices	501	4,201	1944	Operating	2	Mission Depend Not Critical	100%	386,117	11,000	397,117	1,195,817	32.3	67.7	POOR	33.2	66.8	POOR	2013	2	DEMO w/o Replacement
Building	016	Laboratories and Research Offices	501	11,808	1943	Operating	1	Mission Critical	100%	1,185,788	17,000	1,202,788	3,871,554	30.6	69.4	POOR	31.1	68.9	POOR	2013	2	DEMO w/o Replacement
Building	016A	Storage	501	339	1960	Operating	2	Mission Depend Not Critical	100%	0	13,560	13,560	42,315	0.0	100.0	EXCELLENT	32.0	68.0	POOR	2013	2	DEMO w/o Replacement
Building	017	Shop, Assembly & Offices	501	2,222	1949	Operating	2	Mission Depend Not Critical	100%	52,096	0	52,096	652,946	8.0	92.0	ADEQUATE	8.0	92.0	ADEQUATE	2020	3	Continue to Operate
Building	025	Labs, Shops & Offc-limited use, storage	501	20,304	1947	Operating	2	Mission Depend Not Critical	5%	0	1,097,600	1,097,600	6,127,702	0.0	n/a	n/a	n/a	n/a	n/a	2013	2	DEMO w/o Replacement
Building	025A	Shop, Assembly & Offices	501	7,514	1963	Operating	2	Mission Depend Not Critical	100%	521,973	15,000	536,973	2,272,172	23.0	77.0	FAIR	23.6	76.4	FAIR		3	Continue to Operate
Building	025B	Waste Treatment Unit Shelter	501	360	1963	Operating	2	Mission Depend Not Critical	100%	0	19,400	19,400	38,350	0.0	100.0	EXCELLENT	50.6	49.4	POOR	2013	2	DEMO w/o Replacement
Building	026	Medical Services, Labs & Offices	501	10,562	1964	Operating	2	Mission Depend Not Critical	100%	47,344	231,770	279,114	3,509,789	1.3	98.7	EXCELLENT	8.0	92.0	ADEQUATE		3	Continue to Operate
Building	027	Dry Lab & Offices (Special Instrument)	501	3,299	1948	Operating	1	Mission Critical	100%	355,285	2,000	357,285	1,054,453	33.7	66.3	POOR	33.9	66.1	POOR		3	Continue to Operate
Building	028	Radio Shelter Facility	501	544	2003	Operating	2	Mission Depend Not Critical	100%	0	0	0	95,747	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	031	Chicken Creek Bldg	501	7,327	1986	Operating	2	Mission Depend Not Critical	100%	0	172,562	172,562	2,184,515	0.0	100.0	EXCELLENT	7.9	92.1	ADEQUATE		3	Continue to Operate
Building	033A	Strawberry Gate Guard House	501	52	1965	Operating	2	Mission Depend Not Critical	100%	0	11,504	11,504	9,843	0.0	100.0	EXCELLENT	116.9	-16.9	POOR		3	Continue to Operate
Building	033B	Blackberry Gate Guard House	501	94	1996	Operating	2	Mission Depend Not Critical	100%	0	0	0	17,792	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	033C	Grizzly Peak Gate Guard House	501	80	1965	Operating	2	Mission Depend Not Critical	100%	0	11,737	11,737	15,142	0.0	100.0	EXCELLENT	77.5	22.5	POOR		3	Continue to Operate
Building	034	ALS Chiller Building	501	5,163	1992	Operating	1	Mission Critical	100%	52,054	0	52,054	3,724,566	1.4	98.6	EXCELLENT	1.4	98.6	EXCELLENT		3	Continue to Operate

Prop Type	Bldg Number	Name	Asset Type	gsf	Year Built	Status	Mission Essential	Mission Essential	% Utiliz	DM	RIC	DM+RIC =TRIC	RPV	FCI	ACI	ACI Descriptor	TSCI (TRIC/RPV)	1-TSCI	TSCI Descriptor	Excess Year	MPI - Modernization Planning Indicator	
Building	036	Grizzly Electrical Substation	501	880	1989	Operating	1	Mission Critical	100%	0	11,613	11,613	1,666,317	0.0	100.0	EXCELLENT	0.7	99.3	EXCELLENT		3	Continue to Operate
Building	037	Utility Services Building	501	5,833	1987	Operating	1	Mission Critical	100%	22,329	29,433	51,762	1,128,630	2.0	98.0	EXCELLENT	4.6	95.4	GOOD		3	Continue to Operate
Building	040	Dry Lab, Assembly & Storage	501	993	1947	Operating	2	Not Critical	100%	28,240	39,720	67,960	240,040	11.8	88.2	FAIR	28.3	71.7	POOR	2013	2	DEMO w/o Replacement
Building	041	Dry Lab, Assembly & Storage	501	995	1948	Operating	2	Not Critical	100%	77,272	39,800	117,072	256,823	30.1	69.9	POOR	45.6	54.4	POOR	2013	2	DEMO w/o Replacement
Building	043	Standby Gen. Shelter (serves Fire House)	501	1,020	1979	Operating	1	Mission Critical	100%	0	3,654	3,654	866,142	0.0	100.0	EXCELLENT	0.4	99.6	EXCELLENT		3	Continue to Operate
Building	044	Dry Lab, Assembly & Storage	501	805	1956	Operating	2	Not Critical	100%	0	32,200	32,200	174,121	0.0	100.0	EXCELLENT	18.5	81.5	FAIR	2013	2	DEMO w/o Replacement
Building	045	Fire Apparatus Laboratories, Shops & Offices	501	3,342	1970	Operating	2	Not Critical	100%	0	20,050	20,050	729,907	0.0	100.0	EXCELLENT	2.7	97.3	GOOD		3	Continue to Operate
Building	046	Laboratories, Shops & Offices	501	54,133	1949	Operating	1	Mission Critical	100%	3,377,424	7,296,024	10,673,448	17,780,086	19.0	81.0	FAIR	60.0	40.0	POOR		3	Continue to Operate
Building	046A	Offices	501	5,563	1977	Operating	1	Mission Critical	100%	44,166	76,229	120,395	1,352,480	3.3	96.7	GOOD	8.9	91.1	ADEQUATE		3	Continue to Operate
Building	047	Offices	501	6,242	1957	Operating	1	Mission Critical	100%	452,004	8,000	460,004	1,803,301	25.1	74.9	POOR	25.5	74.5	POOR		3	Continue to Operate
Building	048	Fire Station, Emerg. Operations Ctr.	501	6,622	1981	Operating	2	Not Critical	100%	37,364	31,776	69,140	1,823,079	2.0	98.0	GOOD	3.8	96.2	GOOD		3	Continue to Operate
Building	050	Laboratories, Shops & Offices	501	48,534	1943	Operating	1	Mission Critical	100%	0	1,468,682	1,468,682	19,032,173	0.0	100.0	EXCELLENT	7.7	92.3	ADEQUATE		3	Continue to Operate
Building	050A	Laboratories, Shops & Offices	501	66,628	1962	Operating	1	Mission Critical	100%	760,422	1,427,933	2,188,355	23,617,793	3.2	96.8	GOOD	9.3	90.7	ADEQUATE		3	Continue to Operate
Building	050B	Laboratories, Shops & Offices	501	63,603	1967	Operating	1	Mission Critical	100%	1,007,587	4,129,943	5,137,530	24,490,333	4.1	95.9	GOOD	21.0	79.0	FAIR		3	Continue to Operate
Building	050C	Offices	501	2,787	1980	Operating	1	Mission Critical	100%	0	39,343	39,343	696,631	0.0	100.0	EXCELLENT	5.6	94.4	ADEQUATE	2020	3	Continue to Operate
Building	050D	Offices (limited use-files/storage)	501	4,959	1979	Operating Pending D&D	3	Not Mission Dependent	5%	0	303,634	303,634	1,318,529	0.0	n/a	n/a	n/a	n/a	n/a	2007	2	DEMO w/o Replacement
Building	050E	Offices	501	10,673	1984	Operating	1	Mission Critical	100%	117,187	98,793	215,980	2,558,592	4.6	95.4	GOOD	8.4	91.6	ADEQUATE		3	Continue to Operate
Building	050F	Offices	501	9,449	1985	Operating	1	Mission Critical	100%	135,905	85,105	221,010	2,547,099	5.3	94.7	ADEQUATE	8.7	91.3	ADEQUATE		3	Continue to Operate
Building	051	Former Bevatron (Demo Project Underway)	501	96,562	1950	D&D in Progress	3	Not Mission Dependent	12%	0	41,040,550	41,040,550	32,277,839	0.0	n/a	n/a	n/a	n/a	n/a	2007	2	DEMO w/o Replacement
Building	051A	Former Bevatron (Demo Project Underway)	501	28,478	1958	D&D in Progress	3	Not Mission Dependent	0%	0	12,096,350	12,096,350	9,513,616	0.0	n/a	n/a	n/a	n/a	n/a	2007	2	DEMO w/o Replacement
Building	052	Dry Laboratory & Offices	501	6,425	1943	Operating	1	Mission Critical	100%	661,720	14,000	675,720	2,076,346	31.9	68.1	POOR	32.5	67.5	POOR	2013	2	DEMO w/o Replacement
Building	052A	Storage	501	516	1961	Operating	2	Not Critical	100%	0	20,640	20,640	137,197	0.0	100.0	EXCELLENT	15.0	85.0	FAIR	2013	2	DEMO w/o Replacement
Building	053	Laboratories, Shops & Offices	501	6,944	1949	Operating	1	Mission Critical	100%	170,444	327,688	498,132	1,794,036	9.5	90.5	ADEQUATE	27.8	72.2	POOR		3	Continue to Operate
Building	054	Cafeteria	501	15,451	1950	Operating	2	Not Critical	100%	167,018	789,053	956,071	5,301,948	3.2	96.8	GOOD	18.0	82.0	FAIR		3	Continue to Operate
Building	054A	Automated Teller Machine Shelter	501	195	1982	Operating	2	Not Critical	100%	0	484	484	42,665	0.0	100.0	EXCELLENT	1.1	98.9	EXCELLENT		3	Continue to Operate
Building	055	Laboratories and Research Offices	501	19,048	1951	Operating	1	Mission Critical	100%	0	1,905,000	1,905,000	7,513,818	0.0	100.0	EXCELLENT	25.4	74.6	POOR	2014	2	DEMO w/o Replacement
Building	055A	Laboratory & Research Office	501	1,529	1985	Operating	1	Mission Critical	100%	36,780	102,615	139,395	458,467	8.0	92.0	ADEQUATE	30.4	69.6	POOR	2014	2	DEMO w/o Replacement
Building	055B	Standby Generator Shelter	501	209	1987	Operating	1	Mission Critical	100%	0	433	433	14,497	0.0	100.0	EXCELLENT	3.0	97.0	GOOD		3	Continue to Operate
Building	056	Accelerator & Research Office	501	1,782	1976	Operating	1	Mission Critical	100%	27,423	119,127	146,550	709,316	3.9	96.1	GOOD	20.7	79.3	FAIR	2014	2	DEMO w/o Replacement
Building	058	Highbay Lab, Shops & Offices	501	10,279	1950	Operating	1	Mission Critical	100%	324,392	4,000	328,392	3,349,039	9.7	90.3	ADEQUATE	9.8	90.2	ADEQUATE		3	Continue to Operate
Building	058A	Highbay Lab, Shops & Offices	501	12,653	1969	Operating	1	Mission Critical	100%	1,047,340	0	1,047,340	4,247,851	24.7	75.3	FAIR	24.7	75.3	FAIR		3	Continue to Operate
Building	060	Highbay Lab	501	3,615	1979	Operating	1	Mission Critical	100%	76,667	241,663	318,330	787,330	9.7	90.3	ADEQUATE	40.4	59.6	POOR	2014	2	DEMO w/o Replacement

Prop Type	Bldg Number	Name	Asset Type	gsf	Year Built	Status	Mission Essential	Mission Essential	% Utiliz	DM	RIC	DM+RIC =TRIC	RPV	FCI	ACI	ACI Descriptor	TSCI (TRIC/RPV)	1-TSCI	TSCI Descriptor	Excess Year	MPI - Modernization Planning Indicator	
Building	061	Storage	501	323	1969	Operating	2	Mission Depend Not Critical	100%	0	6,936	6,936	56,649	0.0	100.0	EXCELLENT	12.2	87.8	FAIR		3	Continue to Operate
Building	062	Laboratories, Shops & Offices	501	55,904	1965	Operating	1	Mission Critical	100%	7,508,547	2,767,005	10,275,552	22,407,457	33.5	66.5	POOR	45.9	54.1	POOR		3	Continue to Operate
Building	062B	Telephone Equip. Storage	501	169	1965	Operating	1	Mission Critical	100%	0	699	699	35,368	0.0	100.0	EXCELLENT	2.0	98.0	EXCELLENT		3	Continue to Operate
Building	063	Laboratories	501	2,696	1963	Operating	1	Mission Critical	100%	22,152	180,228	202,380	786,486	2.8	97.2	GOOD	25.7	74.3	POOR	2014	2	DEMO w/o Replacement
Building	064	Laboratories, Shops, Assembly & Offices	501	29,358	1951	Operating	1	Mission Critical	100%	1,097,509	0	1,097,509	9,901,510	11.1	88.9	FAIR	11.1	88.9	FAIR	2016	3	Continue to Operate
Building	065	Offices	501	3,423	1952	Operating	2	Mission Depend Not Critical	100%	0	33,827	33,827	960,124	0.0	100.0	EXCELLENT	3.5	96.5	GOOD		3	Continue to Operate
Building	066	Laboratories & Offices	501	44,121	1987	Operating	1	Mission Critical	100%	463,638	47,529	511,167	16,983,343	2.7	97.3	GOOD	3.0	97.0	GOOD		3	Continue to Operate
Building	067/67A	Molecular Foundry (Labs-Shops-Offices)	501	97,155	2006	Operating	1	Mission Critical	100%	0	0	0	55,624,625	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	068	Water Distribution Pump Shelter	501	500	1979	Operating	2	Mission Depend Not Critical	100%	1,757	0	1,757	94,197	1.9	98.1	EXCELLENT	1.9	98.1	EXCELLENT		3	Continue to Operate
Building	069	Shipping & Receiving, Archives, Offices	501	20,461	1967	Operating	2	Mission Depend Not Critical	100%	1,790	0	1,790	4,970,226	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	070	Laboratories, Shops & Offices	501	63,427	1955	Operating	1	Mission Critical	100%	1,714,710	1,603,756	3,318,466	20,879,870	8.2	91.8	ADEQUATE	15.9	84.1	FAIR		3	Continue to Operate
Building	070A	Laboratories, Shops & Offices	501	68,398	1961	Operating	1	Mission Critical	100%	1,587,377	1,291,521	2,878,898	21,851,997	7.3	92.7	ADEQUATE	13.2	86.8	FAIR		3	Continue to Operate
Building	070B	Telephone Equip. Storage	501	382	1979	Operating	1	Mission Critical	100%	0	1,937	1,937	98,304	0.0	100.0	EXCELLENT	2.0	98.0	EXCELLENT		3	Continue to Operate
Building	071	Laboratories, Shops & Offices	501	53,668	1956	Operating	1	Mission Critical	37%	3,873,849	90,000	3,963,849	21,344,267	18.1	81.9	FAIR	18.6	81.4	FAIR		3	Continue to Operate
Building	071A	Lab & Office	501	4,041	1964	Operating	2	Mission Depend Not Critical	100%	465,748	0	465,748	1,058,408	44.0	56.0	POOR	44.0	56.0	POOR		3	Continue to Operate
Building	071B	Shops & Offices	501	6,892	1978	Operating	1	Mission Critical	100%	502,905	15,000	517,905	2,017,299	24.9	75.1	FAIR	25.7	74.3	POOR		3	Continue to Operate
Building	071T	EETD Windows Test Facility	501	949	2003	Operating	1	Mission Critical	100%	0	1	1	172,778	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		3	Continue to Operate
Building	072	Nat'l Ctr for Electron Microscopy (NCEM)	501	5,352	1961	Operating	1	Mission Critical	100%	656,288	8,000	664,288	1,613,199	40.7	59.3	POOR	41.2	58.8	POOR		3	Continue to Operate
Building	072A	NCEM TEAM 0.5	501	2,532	1980	Operating	1	Mission Critical	100%	143,296	1,000	144,296	713,211	20.1	79.9	FAIR	20.2	79.8	FAIR		3	Continue to Operate
Building	072B	Microscope	501	4,508	1984	Operating	1	Mission Critical	100%	194,693	1,000	195,693	1,243,049	15.7	84.3	FAIR	15.7	84.3	FAIR		3	Continue to Operate
Building	072C	Nat'l Ctr for Electron Microscopy (NCEM)	501	8,409	1984	Operating	1	Mission Critical	100%	517,326	9,000	526,326	2,665,183	19.4	80.6	FAIR	19.7	80.3	FAIR		3	Continue to Operate
Building	073	Laboratories, Shops & Offices	501	4,228	1961	Operating Shutdown Pending	1	Mission Critical	100%	353,879	7,000	360,879	1,419,243	24.9	75.1	FAIR	25.4	74.6	POOR		3	Continue to Operate
Building	073A	Utility Equipment Building	501	403	1961	Operating Shutdown Pending D&D	3	Not Mission Dependent	0%	0	16,120	16,120	77,992	0.0	n/a	n/a	n/a	n/a	n/a	2006	2	DEMO w/o Replacement
Building	074	Laboratories & Offices	501	45,382	1962	Operating	1	Mission Critical	100%	4,755,086	25,712,000	30,467,086	17,013,438	27.9	72.1	POOR	179.1	-79.1	POOR		3	Continue to Operate
Building	074F	Dog Kennel	501	1,560	1996	Operating	1	Mission Critical	100%	361	0	361	192,943	0.2	99.8	EXCELLENT	0.2	99.8	EXCELLENT		3	Continue to Operate
Building	075	Laboratories & Offices	501	8,498	1961	Operating	1	Mission Critical	100%	792,750	7,000	799,750	2,927,050	27.1	72.9	POOR	27.3	72.7	POOR		3	Continue to Operate
Building	075A	EH&S Lab	501	4,000	1987	Operating	2	Mission Depend Not Critical	100%	19,300	1,000	20,300	1,145,550	1.7	98.3	EXCELLENT	1.8	98.2	EXCELLENT		3	Continue to Operate
Building	075C	EH&S Calibration Building	501	450	1979	Operating	2	Mission Depend Not Critical	100%	0	58,469	58,469	53,928	0.0	100.0	EXCELLENT	108.4	-8.4	POOR		3	Continue to Operate
Building	075D	Storage	501	1,895	1979	Operating	2	Mission Depend Not Critical	100%	0	75,800	75,800	283,558	0.0	100.0	EXCELLENT	26.7	73.3	POOR		3	Continue to Operate
Building	076	Facilities Div Shops & Offices	501	31,642	1964	Operating	2	Mission Depend Not Critical	100%	377,943	1,501,841	1,879,784	9,590,232	3.9	96.1	GOOD	19.6	80.4	FAIR		3	Continue to Operate
Building	077	Central EG Shops, Assembly & Labs	501	68,938	1963	Operating	1	Mission Critical	100%	6,912,827	1,210,294	8,123,121	23,552,577	29.4	70.6	POOR	34.5	65.5	POOR		3	Continue to Operate
Building	077A	Composites Lab and Assembly Facility	501	12,118	1988	Operating	1	Mission Critical	100%	4,068	259,632	263,700	3,708,589	0.1	99.9	EXCELLENT	7.1	92.9	ADEQUATE		3	Continue to Operate

Prop Type	Bldg Number	Name	Asset Type	gsf	Year Built	Status	Mission Essential	Mission Essential	% Utiliz	DM	RIC	DM+RIC =TRIC	RPV	FCI	ACI	ACI Descriptor	TSCI (TRIC/RPV)	1-TSCI	TSCI Descriptor	Excess Year	MPI - Modernization Planning Indicator	
Building	077H	Utility Storage	501	576	1983	Operating	2	Mission Depend Not Critical	100%	13,243	3,000	16,243	127,196	10.4	89.6	FAIR	12.8	87.2	FAIR	3	Continue to Operate	
Building	078	Storage & Assembly	501	5,391	1966	Operating	2	Mission Depend Not Critical	100%	120,477	0	120,477	1,104,418	10.9	89.1	FAIR	10.9	89.1	FAIR	3	Continue to Operate	
Building	079	Salvage Processing Facility	501	4,564	1965	Operating	2	Mission Depend Not Critical	100%	77,854	116,349	194,203	1,042,742	7.5	92.5	ADEQUATE	18.6	81.4	FAIR	3	Continue to Operate	
Building	080	Laboratories, Shops & Offices	501	29,912	1954	Operating	1	Mission Critical	100%	28,007	711,529	739,536	12,993,535	0.2	99.8	EXCELLENT	5.7	94.3	ADEQUATE	3	Continue to Operate	
Building	080A	Offices	501	960	1977	Operating	2	Mission Depend Not Critical	100%	53,855	6,365	60,220	265,889	20.3	79.7	FAIR	22.6	77.4	FAIR	3	Continue to Operate	
Building	081	Facilities Chemical & Other Storage	501	1,129	1968	Operating	2	Mission Depend Not Critical	100%	0	2,090	2,090	194,632	0.0	100.0	EXCELLENT	1.1	98.9	EXCELLENT	3	Continue to Operate	
Building	082	Water Distribution Pump Shelter	501	537	1981	Operating	2	Mission Depend Not Critical	100%	702	0	702	100,718	0.7	99.3	EXCELLENT	0.7	99.3	EXCELLENT	3	Continue to Operate	
Building	083	Laboratories & Offices	501	6,856	1979	Operating	1	Mission Critical	100%	14,572	1,526,674	1,541,246	2,639,493	0.6	99.4	EXCELLENT	58.4	41.6	POOR	3	Continue to Operate	
Building	084	Laboratories & Offices	501	55,031	1997	Operating	1	Mission Critical	100%	0	355,303	355,303	24,477,118	0.0	100.0	EXCELLENT	1.5	98.5	EXCELLENT	3	Continue to Operate	
Building	084B	Utility Building	501	1,633	1997	Operating	1	Mission Critical	100%	1,314	6,575	7,889	804,801	0.2	99.8	EXCELLENT	1.0	99.0	EXCELLENT	3	Continue to Operate	
Building	085	Hazardous Waste Handling Facility (HWHF)	501	15,405	1996	Operating	1	Mission Critical	100%	2,981	9,360,000	9,362,981	5,862,804	0.1	99.9	EXCELLENT	159.7	-59.7	POOR	3	Continue to Operate	
Building	085A	HWHF Storage Racks	501	885	1996	Operating	2	Mission Depend Not Critical	100%	0	1,222	1,222	158,231	0.0	100.0	EXCELLENT	0.8	99.2	EXCELLENT	3	Continue to Operate	
Building	088	88 Cyclotron User Facility	501	54,428	1960	Operating	1	Mission Critical	100%	581,474	2,095,288	2,676,762	29,014,302	2.0	98.0	GOOD	9.2	90.8	ADEQUATE	3	Continue to Operate	
Building	088D	88 Standby Generator Shelter	501	265	1979	Operating	2	Mission Depend Not Critical	100%	770	5,582	6,352	392,587	0.2	99.8	EXCELLENT	1.6	98.4	EXCELLENT	3	Continue to Operate	
Building	090	Offices	501	87,721 1,731,363	1960	Operating	1	Mission Critical	100%	708,095	2,718,872	3,426,967	32,568,751	2.2	97.8	GOOD	10.5	89.5	FAIR	3	Continue to Operate	
Real Property Trailers																						
Trailer	007C	Offices	501	479	1977	Operating	2	Mission Depend Not Critical	100%	0			88,127									
Trailer	029A	(vacant) red-tagged	501	1,751	1978	Shutdown Pending	3	Not Mission Depend	0%	0			337,736							2006		
Trailer	029B	(vacant) red-tagged	501	1,440	1978	Shutdown Pending	3	Not Mission Depend	0%	0			277,750							2006		
Trailer	029C	(vacant) red-tagged	501	1,440	1978	Shutdown Pending	3	Not Mission Depend	0%	0			277,750							2006		
Trailer	031A	FA	501	623	1978	Operating	2	Mission Depend Not Critical	100%	0			114,620									
Trailer	044A	ALS offices	501	481	1979	Operating	1	Mission Critical	100%	0			104,040							2012		
Trailer	044B	ENG	501	1,441	1979	Operating	1	Mission Critical	100%	0			265,117							2012		
Trailer	046B	ENG	501	1,238	1979	Operating	1	Mission Critical	100%	0			227,953									
Trailer	046C	AFR	501	1,029	1977	Operating	1	Mission Critical	100%	0			189,317									
Trailer	046D	AFR	501	771	1984	Operating	1	Mission Critical	100%	0			141,850									
Trailer	051F	ES, EET	501	1,499	1979	Operating	1	Mission Critical	100%	42,011			275,788							2020		
Trailer	062A	EE, MS	501	1,238	1978	Operating	1	Mission Critical	100%	24,165			227,769									
Trailer	064B	FAC	501	480	1977	Operating	2	Mission Depend Not Critical	100%	11,423			88,311							2016		
Trailer	065A	Offices	501	1,453	1984	Operating	2	Mission Depend Not Critical	100%	11,076			267,325									
Trailer	065B	Offices	501	1,020	1983	Operating	2	Mission Depend Not Critical	100%	4,550			187,661									
Trailer	071C	Offices	501	511	1968	Operating	1	Mission Critical	100%	26,396			94,014							2012		
Trailer	071D	Offices	501	520	1970	Operating	1	Mission Critical	100%	4,843			95,670							2012		
Trailer	071G	Offices	501	517	1974	Operating	1	Mission Critical	100%	0			95,117							2012		
Trailer	071J	Offices	501	1,289	1978	Operating	1	Mission Critical	100%	0			237,152							2012		

Prop Type	Bldg Number	Name	Asset Type	gsf	Year Built	Status	Mission Essential	Mission Essential	% Utiliz	DM	RIC	DM+RIC =TRIC	RPV	FCI	ACI	ACI Descriptor	TSCI (TRIC/RPV)	1-TSCI	TSCI Descriptor	Excess Year	MPI - Modernization Planning Indicator
Trailer	071P	Offices	501	511	1981	Operating	1	Mission Critical	100%	0			94,014							2012	
Trailer	075B	EH&S	501	4,640	1979	Operating	2	Not Critical	100%	0			918,562								
Trailer	075E	EH&S Offices	501	410	1978	Operating	3	Not Mission Dependent	100%	0			75,432							2006	
Trailer	076L	FA Offices	501	1,439	1977	Operating	2	Not Critical	100%	0			264,749								
Trailer	085B	Offices	501	3,601	1996	Operating	2	Not Critical	100%	0			710,456								
Trailer	090B	Offices	501	1,443	1977	Operating	2	Not Critical	100%	727			265,485								
Trailer	090C	Ops Offices	501	1,143	1977	Operating	2	Not Critical	100%	0			219,490							2012	
Trailer	090F	FA Offices	501	2,464	1979	Operating	2	Not Critical	100%	0			452,962								
Trailer	090G	HR Offices	501	1,851	1978	Operating	2	Not Critical	100%	0			340,917								
Trailer	090H	FA Offices	501	1,849	1977	Operating	2	Not Critical	100%	0			340,182								
Trailer	090J	FA Offices	501	2,845	1978	Operating	2	Not Critical	100%	0			523,611								
Trailer	090K	EETD Offices	501	2,846	1978	Operating	1	Mission Critical	100%	0			523,611								
Trailer	090P	Ops Offices	501	2,133	1979	Operating	2	Not Critical	100%	0			391,696								
Trailer	090Q	Restroom Trailer	501	425	1978	Operating	2	Not Critical	100%	0			77,977								
Personal Property Trailers																					
Trailer	010A	Telecommunications Equipment	725	242	1960	Operating	1	Mission Critical	100%	0			88,127								
Trailer	031B	Storage	725	157	1965	Operating	2	Not Critical	100%	0			3,117								
Trailer	031C	Storage	725	157	1965	Operating	2	Not Critical	100%	0			3,118								
Trailer	048A	Storage Container	725	320	1978	Operating	2	Not Critical	100%	0			4,024								
Trailer	053B	AFR	725	519	1972	Operating	1	Mission Critical	100%	0			95,486								
Trailer	070E	Storage Container	725	432	1979	Operating	2	Not Critical	100%	0			5,433								
Trailer	070G	Storage	725	173	1979	Operating	2	Not Critical	100%	0			31,829								
Trailer	071F	Offices	725	516	1974	Operating	1	Mission Critical	100%	0			94,934							2012	
Trailer	071K	Offices	725	474	1974	Operating	1	Mission Critical	100%	0			87,207							2012	
Trailer	071Q	Restroom Trailer	725	357	1996	Operating	2	Not Critical	100%	0			65,500							2012	
Trailer	076K	FA Offices	725	371	1974	Operating	2	Not Critical	100%	0			68,257								
Trailer	083A	LS Lab Trailer	725	507	1965	Operating	1	Mission Critical	100%	0			93,279								
Trailer	090R	Transformer Equipment	725	160	1979	Operating	2	Not Critical	100%	660			3,177								

Map of LBNL Site with Buildings Highlighted



Appendix 3 Inventory and Map of Infrastructure/Site Utility Systems

Utility and Infrastructure Assets (partial list of OSF items in FIMS)

Other Structure	ID	Name	Qty	Unit of Measure	Year Acquired	Status	Mission Essential	DM	RIC	RPV	MPI
S	115KVA GRIZZLY SUBST	Grizzly Peak Substation	115	KVA	2005	Operating	Mission Critical	160,257	0	12,791,228	Continue to Operate
S	12KV SW ST A2	Grizzly Peak at 36	50000	KVA	1989	Operating	Mission Critical	0	50,943	1,339,334	Continue to Operate
S	12KV SW ST A3 (6)	Switching Station for the ALS	52125	KVA	1990	Operating	Mission Critical	122,325	41,029	2,780,417	Continue to Operate
S	12KV SW ST A4-(35)	Original Lab Site Sw Station (near 45)	9000	KVA	1995	Operating	Mission Critical	0	48,939	2,723,542	Continue to Operate
S	12KV SW ST A5 (66A)	East Canyon Sw Station (NE of 66)	9000	KVA	1996	Operating	Mission Critical	0	47,990	2,048,297	Continue to Operate
S	12KV SW ST A6 (64C)	Blackberry Canyon Sw Station	18000	KVA	2000	Operating	Mission Critical	0	88,960	2,915,926	Continue to Operate
S	13J	Pump Enclosure/Shelter and Tank	234000	GAL	2004	Operating	Mission Depend Not Critical	0	0	1,000,227	Continue to Operate
S	58E	Storage for compressor	64	SQFT	1965	Operating	Mission Depend Not Critical	0	279	1,588	Continue to Operate
S	BRDG-VEH	Bridge (Vehicular)	140	FEET	1976	Operating	Mission Depend Not Critical	0	161,306	2,168,158	Continue to Operate
S	BUS STOPS	site-wide bus stops	10	EACH	1960	Operating	Mission Depend Not Critical	0	0	48,018	Continue to Operate
S	CABLES ELECTRICAL	Underground Electrical Cables	55	MILES	1970	Operating	Mission Critical	0	53,830	7,780,811	Continue to Operate
S	CABLS,UNDGD,VOICE	Cables, Undergrd (Voice/Data) G4030	39400	FEET	1970	Operating	Mission Critical	0	17,273	927,085	Continue to Operate
S	COMM & SECURITY SYS	Communications & Security Systems G4030	1	EACH	1970	Operating	Mission Critical	0	1,728	282,741	Continue to Operate
S	CURB & GUTTER	Curb & Gutter	4	MILES	1970	Operating	Mission Depend Not Critical	0	101,445	513,094	Continue to Operate
S	DIESEL GENERATOR	Generator located near 64	2000	KVA	2001	Operating	Mission Critical	0	9,134	1,535,867	Continue to Operate
S	DRUM RACKS	Drum Storage Racks	1	EACH	1996	Operating	Mission Depend Not Critical	0	0	158,231	Continue to Operate
S	DUCTBANK	Ductbank	8	MILES	1970	Operating	Mission Critical	323,460	874,199	22,017,012	Continue to Operate
S	EMERGENCY GENERATORS	Emergency Generators	62776	KVA	1970	Operating	Mission Critical	0	271,053	1	Continue to Operate
S	ENERGY CONTROL SYS	Energy Monitoring & Control System	1	PTS	1990	Operating	Mission Depend Not Critical	0	1,713,227	19,854,923	Continue to Operate
S	FENCE	FENCING	21919	FEET	1970	Operating	Mission Depend Not Critical	0	91,362	1,092,169	Continue to Operate
S	FIRE ALARM CABLES	Cables, Undergrd (Fire Alarm) G4030	25000	FEET	1970	Operating	Mission Critical	534,396	434,066	1,323,662	Continue to Operate
S	GAS PUMP	Gas Pumps by Bldg 76	20	GPM	1970	Operating	Mission Depend Not Critical	0	1,945	87,362	Continue to Operate
S	GUARD RAILS	Guard Rails	3	MILES	1970	Operating	Mission Depend Not Critical	0	28,606	967,197	Continue to Operate
S	LOAD DOCK/PLATFORM	Loading Dock and Parking Platform	1	EACH	1986	Operating	Mission Depend Not Critical	0	0	110,746	DEMOM w/o Replacement
S	PIP, COMP AIR	Piping (Compressed Air)	10838	FEET	1970	Operating	Mission Critical	0	359,594	1,758,465	Continue to Operate
S	PIP, LCW	Piping (Low Conductivity Water)	12458	FEET	1970	Operating	Mission Critical	0	550,251	4,302,118	Continue to Operate
S	PIP, NAT GAS	Piping (Natural Gas)	23335	FEET	1970	Operating	Mission Critical	0	376,773	2,797,639	Continue to Operate
S	PIP, OTHER	Other, Water Lines (Treated Water)	4537	FEET	1970	Operating	Mission Critical	0	235,349	2,530,552	Continue to Operate
S	PIP, POTABLE	Piping (Potable, Domestic City Water)	62602	FEET	1970	Operating	Mission Critical	0	1,537,551	8,172,884	Continue to Operate
S	PKG, VEHIC	Parking (Vehicular)	58580	SQYD	1970	Operating	Mission Depend Not Critical	0	27,529	3,221,924	Continue to Operate
S	RADIO TOWER	Radio Transmission Tower	140	HGTFT	2003	Operating	Mission Depend Not Critical	0	0	298,440	Continue to Operate
S	RD-PRIMARY	Road, Primary	3	MILES	1970	Operating	Mission Depend Not Critical	0	669,703	6,659,592	Continue to Operate
S	RD-SEC	Road, Secondary	2	MILES	1970	Operating	Mission Depend Not Critical	0	336,311	3,145,828	Continue to Operate
S	RET WALLS	Retaining Walls	237	EACH	1970	Operating	Mission Depend Not Critical	78,833	106,324	8,480,368	Continue to Operate
S	SEWAGE MONITER	Sewage Monitoring Systems	1	EACH	1980	Operating	Mission Critical	0	540,999	112,511	Continue to Operate
S	SEWAGE PIPING	Piping (Gravity, Sewage)	28897	FEET	1980	Operating	Mission Critical	0	413,163	4,442,698	Continue to Operate
S	SIDEWLK	Sidewalk	8550	FEET	1970	Operating	Mission Depend Not Critical	2,901	358,437	2,714,769	Continue to Operate

Utility and Infrastructure Assets (partial list of OSF items in FIMS)

Other Structure	ID	Name	Qty	Unit of Measure	Year Acquired	Status	Mission Essential	DM	RIC	RPV	MPI
S	SITE/LANDSCPING	Site Prep, Grading, Landscapng	1	EACH	1960	Operating	Mission Depend Not Critical	0	452,961	10,132,818	Continue to Operate
S	STORM DRAIN/PIPE	Piping (Gravity, Storm Drain)	35900	FEET	1970	Operating	Mission Depend Not Critical	0	874,213	6,181,187	Continue to Operate
S	STREET LIGHTING	Street Lighting	206	EACH	1960	Operating	Mission Depend Not Critical	0	58,484	2,113,226	Continue to Operate
S	TANK, UST - 55	Undergrnd Storage Tank	1000	GAL	1986	Operating	Mission Depend Not Critical	0	0	83,921	Continue to Operate
S	TANK, UST - 85	Undergrnd Storage Tank	2500	GAL	1995	Operating	Mission Depend Not Critical	0	0	90,748	Continue to Operate
S	TANKS, AST-SITIEWIDE	Aboveground Storage Tanks	24381	GAL	1995	Operating	Mission Depend Not Critical	0	0	548,237	Continue to Operate
S	TANKS, UST - 2	Undergrnd Storage Tanks	5000	GAL	1988	Operating	Mission Depend Not Critical	0	0	201,985	Continue to Operate
S	TANKS, UST - 76	Unleaded Gasoline & Diesel Storage, Water Tanks	20000	GAL	1990	Operating	Mission Critical	0	11,185	354,498	Continue to Operate
S	TANKS, WATER	Storage, Water Tanks	460000	GAL	1978	Operating	Mission Critical	0	54,322	2,000,453	Continue to Operate
S	TELEPHONE SYS	Telephone System	1	EACH	1980	Operating	Mission Critical	0	122,132	2,117,858	Continue to Operate
S	UNIT SUBSTATIONS	Sitewide Unit Substations	52125	KVA	1998	Operating	Mission Critical	187,771	114,708	8,991,568	Continue to Operate
S	WASTE TREATMT	Indst/Hazard Waste Treatment Processors	5	GPD	1980	Operating	Mission Critical	0	113,831	650,461	Continue to Operate
S	WEATHER TOWER	Weather Tower by 44A	1	EACH	1970	Operating	Mission Depend Not Critical	0	0	37,129	Continue to Operate

Appendix 4. Integrated Facilities and Infrastructure (IFI) Crosscut Budget Submission

BLOCKS 1 – 4

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07	Deferred Maintenance Reduction	Gross Building Area Added	Gross Building Area Removed	FY 07 Projected (\$000)	FY 08 Approp. (\$000)	FY 09 to Congress (\$000)	FY 10 (\$000)	FY 11 (\$000)	FY 12 (\$000)	FY 13 (\$000)	FY 14 (\$000)	FY 15 (\$000)	FY 16 (\$000)	FY 17 (\$000)
SITE NAME: Lawrence Berkeley National Laboratory														
PROGRAM: Science (HEP)														
1.0 Capital Line Item														
1.1 New Infrastructure Construction (facilities and additions)														
Seismic Safety of General Purpose Buildings Phase 2 [SC Project 1(a)]	6,957	43,000	(43,060)			13,495	13,741	22,592	23,423	23,620				
Seismic Safety of General Purpose Buildings, Phase 3 [SC Project 1(b)]	1,000	35,000	(74,000)					14,000	19,864	20,700	20,196	16,240		
Seismic Safety of Vintage Structures [SC Project 3]	6,544	43,000	-									29,000	45,000	48,000
Subtotal 1.1	14,501	121,000	(117,060)	-	-	13,495	13,741	36,592	43,287	44,320	20,196	45,240	45,000	48,000
1.2 All Other Infrastructure Projects (recap)														
Seismic & Structural Safety Upgrades of Buildings Phase 1 - Buildings 74 & 50 - SLI				5,111	7,000	4,889								
Seismic Safety of Building 70 [SC Project 2]	3,722									24,500	29,500	14,500	15,500	
Subtotal 1.2	3,722	-	-	5,111	7,000	4,889	-	-	-	24,500	29,500	14,500	15,500	-
Total Infrastructure Line Items (1.1 + 1.2)	18,223	121,000	(117,060)	5,111	7,000	18,384	13,741	36,592	43,287	68,820	49,696	59,740	60,500	48,000
1.3 Programmatic Line Items that Add Space														
Molecular Foundry - BES		95,692		257										
User Support Building - BES	22,196	30,000	(15,200)	3,000	17,200	10,000								
Subtotal 1.3	22,196	125,692	(15,200)	3,257	17,200	10,000	-	-	-	-	-	-	-	-
Subtotal Line Item Projects (1.1 +1.2+1.3)	40,419	246,692	(132,260)	8,368	24,200	28,384	13,741	36,592	43,287	68,820	49,696	59,740	60,500	48,000
2.0 General Plant Project (GPP) (Include project number & identify Funding Program)														
2.1 New Construction (facilities and additions)														

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07	Deferred Maintenance Reduction	Gross Building Area Added	Gross Building Area Removed	FY 07 Projected (\$000)	FY 08 Approp. (\$000)	FY 09 to Congress (\$000)	FY 10 (\$000)	FY 11 (\$000)	FY 12 (\$000)	FY 13 (\$000)	FY 14 (\$000)	FY 15 (\$000)	FY 16 (\$000)	FY 17 (\$000)
SITE NAME: Lawrence Berkeley National Laboratory														
PROGRAM: Science (HEP)														
New Animal Care Facility (note: seismic safety driver)		5,005		200										
2.2 All Other GPP Projects (recap including alterations and improvements)														
Upgrade Building 72A for TEAM 0.5 Microscope				175										
Building 72 - Upgrade Structural Elements for Seismic Safety				100	430									
Upgrade Building 6 Room 2263 for Chemical Dynamics Lab				568										
Upgrade Building 72B for TEAM 1.0 Microscope				200	800									
Building 71 Space Conversions – Rooms 146A, P, Q & R				2,000										
Building 2 Room 308 Cooling Upgrade				248										
Building 53 – Upgrade Shop Area				60	240									
Building 83 Upgrade				356	249									
Building 70 – Upgrade Room 158				150										
Building 70 – Upgrade Room 269					140									
Building 62 - Convert Shop/Assembly Highbay to Office/Labs (TEC = \$4,900)					2,676									
Unallocated Reserve - Pending Completion of Prioritization				8										
Subtotal (2.1 + 2.2) High Energy Physics Landlord GPP	-	5,005	-	4,065	4,535		-	-	-	-	-	-	-	-
2.3 Other DOE GPP - Safety and Security					4,535									
Strawberry Gate Improvements						150								
Grizzly Peak Gate Improvements						50								
Security Control Center						400								
Subtotal 2.3 Other DOE GPP - Safety & Security GPP:	-	-	-	-	4,535	600	-	-	-	-	-	-	-	-

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07	Deferred Maintenance Reduction	Gross Building Area Added	Gross Building Area Removed	FY 07 Projected (\$000)	FY 08 Approp. (\$000)	FY 09 to Congress (\$000)	FY 10 (\$000)	FY 11 (\$000)	FY 12 (\$000)	FY 13 (\$000)	FY 14 (\$000)	FY 15 (\$000)	FY 16 (\$000)	FY 17 (\$000)
SITE NAME: Lawrence Berkeley National Laboratory														
PROGRAM: Science (HEP)														
B74 2nd Floor Lab Upgrade	-			-	-	4,900	-	-	-	-	-	-	-	-
Total 2.0 Operating/Expense Projects (2.1 + 2.2 + 2.3)	-	5,005	-	4,065	9,070	#VALUE!	-	-	-	-	-	-	-	-
3.0 Institutional General Plant Project (IGPP)														
Upgrades to Accommodate Moves From Calvin Lab				465		50								
Priority Institutional Upgrade Projects (tbd)	-	-		35	500	4,100	4,100	4,500	5,500	6,000	6,000	6,000	6,000	6,000
Total IGPP Projects (3.0)	-	-	-	500	500	4,150	4,100	4,500	5,500	6,000	6,000	6,000	6,000	6,000
4.0 Operating/Expense for Excess Elimination and Other														
4.1 Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column														
Demolition of Building 51 - Complex			(126,527)	3,850	6,145	17,204	24,250	8,291						
Subtotal 4.1	-	-	(126,527)	3,850	6,145	17,204	24,250	8,291	-	-	-	-	-	-
4.2 All Other (List direct O&E maintenance under 5.1)														
Provide project level detail														
Subtotal 4.2				-	-	-	-	-	-	-	-	-	-	-
Total 4.0 Operating/Expense Projects (4.1 + 4.2)	-	-	(126,527)	3,850	6,145	17,204	24,250	8,291	-	-	-	-	-	-
TOTAL Capital & Operating Investment:	40,419	251,697	(258,787)	16,283	39,415	#VALUE!	37,991	44,883	43,287	68,820	49,696	59,740	60,500	48,000
TOTAL Overhead Investments (IGPP)	-	-	-	500	500	4,150	4,100	4,500	5,500	6,000	6,000	6,000	6,000	6,000

BLOCKS 5 – 6

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07	Gross Sq Ft.	FY 07 Approp. (\$000)	FY 08 to Congress (\$000)	FY 09 (\$000)	FY 10 (\$000)	FY 11 (\$000)	FY 12 (\$000)	FY 13 (\$000)	FY 14 (\$000)	FY 15 (\$000)	FY 16 (\$000)	FY 17 (\$000)	FY 18 (\$000)
SITE NAME: Lawrence Berkeley National Laboratory													
PROGRAM: Science (HEP)													
5.0 Maintenance & Repair													
5.1 Direct Funded (by HQ or Site Program)													
List direct O/E maintenance projects >\$500,000													
Subtotal 5.1 Total Direct Maintenance & Repair		-	-	-	-	-	-	-	-	-	-	-	-
5.2 Indirect (from Overhead or Space Charges)													
Include indirect O/E maintenance projects > \$500,000													
Maintenance Projects (See Note 1)		1,300	938	3,399	3,958	3,751	5,600	5,444	5,607	5,776	5,949	6,127	6,311
Preventive Maintenance (See Note 1)		7,000	7,300	7,600	7,900	8,300	8,600	9,000	9,270	9,548	9,835	10,130	10,433
Corrective, Routine and Emergency Repairs (See Note 1)		4,700	4,900	5,100	5,300	5,500	5,800	6,000	6,180	6,365	6,556	6,753	6,956
Subtotal 5.2 Total Indirect Maintenance & Repair (See Note 1)		13,000	13,138	16,099	17,158	17,551	20,000	20,444	21,057	21,689	22,340	23,010	23,700
Subtotal Total Maintenance & Repair (5.1 + 5.2)		13,000	13,138	16,099	17,158	17,551	20,000	20,444	21,057	21,689	22,340	23,010	23,700
5.3 Hqs Direct Funded Deferred Maintenance Reduction													
Subtotal 5.3 Total Direct Deferred Maintenance		-	-	-	-	-	-	-	-	-	-	-	-
5.4 Indirect Funded Deferred Maintenance Reduction (from Overhead or Space Charges) (See Note 1)		2,178	6,069	8,851	11,632	11,632	11,632						
Include indirect O/E maintenance projects > \$500,000													
Subtotal 5.4 Total Indirect Deferred Maintenance		2,178	6,069	8,851	11,632	11,632	11,632	-	-	-	-	-	-
Total Deferred Maintenance (5.3 + 5.4)		2,178	6,069	8,851	11,632	11,632	11,632	-	-	-	-	-	-
Total Maintenance (5.1 + 5.2 +5.3 +5.4)		15,178	19,207	24,950	28,790	29,183	31,632	20,444	21,057	21,689	22,340	23,010	23,700
6.0 Indirect O&E													
6.1 Excess Elimination (demolition, sale, lease, transfer) funded from indirect funds. Show area eliminated in Gross Area column (Detail of Partial IGPP Total Costs)													
Demolition of Building 29A, 29B & 29C	(4,631)	200											
Demolition of Buildings 55A, 56, 60, 63, 90C, 71F, 71K, 71Q	(12,172)			500	500			500	500				
Demolition of Buildings 5A, 5B, 16A, 40, 41, 44, 50C, 50D, 52, 51F, 52A, 64B	(12,372)					500	500					500	500
6.1 Total Indirect Excess Elimination	(29,175)	200	-	500	500	500	500	500	500	-	-	500	500

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07	Gross Sq Ft.	FY 07 Approp. (\$000)	FY 08 to Congress (\$000)	FY 09 (\$000)	FY 10 (\$000)	FY 11 (\$000)	FY 12 (\$000)	FY 13 (\$000)	FY 14 (\$000)	FY 15 (\$000)	FY 16 (\$000)	FY 17 (\$000)	FY 18 (\$000)
SITE NAME: Lawrence Berkeley National Laboratory													
PROGRAM: Science (HEP)													
6.2 Other Indirect Funded (includes modifications, additions, improvements, etc. that does not qualify as GPP or maintenance)													
6.2 Total Other Indirect O&E	-	-	-	-	-	-	-	-	-	-	-	-	-
6.0 Total Indirect O&E	(29,175)	200	-	500	500	500	500	500	500	-	-	500	500

Note 1 : Due to the continued discussion regarding the new "site factors" for the Replacement Plant Value (RPV), the costs for FY 2010 and beyond are not yet completed and currently represent the data submitted in the previous Ten Year Site Plan (TYSP). The allocation of costs between the maintenance projects, preventive maintenance, and corrective maintenance has been adjusted

BLOCK 7

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07		Project Number	Gross SF Removed	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft
SITE NAME: Lawrence Berkeley National Laboratory															
PROGRAM: Science (HEP)															
7.0 Summary of Area Added & Eliminated by Year															
7.1 Total Area to be Eliminated Each Year (List of projects, by type of funding, with project number, and AREA eliminated by fiscal year accomplished).															
Line Item from Block 1 (show each that removes space)															
Seismic Safety of General Purpose Buildings Phase 2 [SC Project 1(a)]		SEISMICPH2													
Buildings 71C, 71D, 71G, 71J, 71P			(3,348)					(3,348)							
Buildings 25, 25B			(20,664)								(20,664)				
Building 55												(19,048)			
Seismic Safety of General Purpose Buildings, Phase 3 [SC Project 1(b)]		SEISMICPH3													
Buildings 14, 17			(6,423)						(6,423)						
Building 16			(11,808)						(11,808)						
Buildings 4, 5			(17,352)						(17,352)						
Building 64			(29,358)										(29,358)		
User Support Building - BES		08-SC-01													
Building 10			(15,200)		(15,200)										
Subtotal Line Items			(104,153)	-	(15,200)	-	-	(3,348)	(35,583)	-	(20,664)	(19,048)	(29,358)	-	
GPP from Block 2 (show each that removes space)															
Subtotal GPP		-	-	-	-	-	-	-	-	-	-	-	-	-	-
IGPP from Block 3 (show each that removes space)															
Subtotal IGPP		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operations/Expense from Block 4.1 (show each that removes space)															
Demolition of Building 51 - Complex		EF-004-001	(126,527)						(126,527)						

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07		Project Number	Gross SF Removed	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft
SITE NAME: Lawrence Berkeley National Laboratory															
PROGRAM: Science (HEP)															
Subtotal Block 4.1	-	(126,527)	-	-	-	-	-	-	(126,527)	-	-	-	-	-	-
Indirect Operations/ Expense from Block 6.1 (show each that removes space)															
Demolition of Building 29A, 29B & 29C	DEMOPLANOPER	(4,631)		(4,631)											
Demolition of Building 90C	DEMOPLANOPER	(1,143)				(1,143)									
Demolition of Buildings 71F, 71K, 71Q	DEMOPLANOPER	(1,347)						(1,347)							
Demolition of Buildings 55A, 56	DEMOPLANOPER	(3,311)									(3,311)				
Demolition of Building 63	DEMOPLANOPER	(2,696)										(2,696)			
Demolition of Building 60	DEMOPLANOPER	(3,615)										(3,615)			
Demolition of Buildings 52, 52A	DEMOPLANOPER	(6,941)							(6,941)						
Demolition of Buildings 5A, 5B, 16A	DEMOPLANOPER	(339)								(339)					
Demolition of Building 64B	DEMOPLANOPER	(480)								(480)					
Demolition of Building 51F	DEMOPLANOPER	(1,499)								(1,499)					
Demolition of Buildings 50C, 50D	DEMOPLANOPER	(7,746)													(4,900)
Subtotal Block 6.1	-	(33,748)	-	(4,631)	-	(1,143)	(1,347)	(6,941)	(2,318)	(3,311)	(6,311)	-	-	-	(4,900)
Transfer by sale or lease, or transfer to an outside federal agency															
Provide detail															
Subtotal Transfer or Lease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal 7.1 Space Removed		(264,428)	-	(19,831)	-	(1,143)	(4,695)	(169,051)	(2,318)	(23,975)	(25,359)	(29,358)	-	-	(4,900)
7.2 Total Area to be Added by GPP, IGPP, and LI Construction (List of projects, by type of funding, with project number, and AREA add by fiscal year accomplished).		Gross SF Added	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft	
Line Item (list)															
Seismic Safety of General Purpose Buildings Phase 2 [SC Project 1(a)]		SEISMICPH2	43,000							43,000					

FY 2009 Integrated Facilities and Infrastructure Budget Data Sheet (IFI) 7 24 07	Project Number	Gross SF Removed	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft
SITE NAME: Lawrence Berkeley National Laboratory														
PROGRAM: Science (HEP)														
Seismic Safety of General Purpose Buildings, Phase 3 [SC Project 1(b)]	SEISMICPH3	35,000								35,000				
Seismic Safety of Vintage Structures [SC Project 3]		43,000												43,000
Molecular Foundry - BES	04-R-313	95,692	95,692											
User Support Building - BES	08-SC-01	30,000					30,000							
Subtotal Line Items		246,692	95,692	-	-	-	30,000	-	-	78,000	-	-	-	43,000
GPP (List)														
New Animal Care Facility (note: seismic safety driver)	GPPPLANDLD	5,005		5,005										
Subtotal GPP		5,005	-	5,005	-	-	-	-	-	-	-	-	-	-
IGPP (List)														
Subtotal IGPP		-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal 7.2 Area Added	-	251,697	95,692	5,005	-	-	30,000	-	-	78,000	-	-	-	43,000

Appendix 5. Detail Information for FY 2009 - 2018 SLI Line Items Projects

FY2009 Candidate - Seismic Safety of General Purpose Buildings, Phase 2

[SC Project 1(a)]

TEC – \$97M (mid-point of construction)

Deferred Maintenance Reduced: \$6.957M

CAMP: 76.2 RPM: 292

Unacceptably high seismic life safety risks are corrected in general-purpose research and lab-wide resource buildings. While some of the smaller buildings and the trailers have yet to be surveyed, based on previous surveys it is anticipated most will be poor.

The seismic safety risks to be addressed in this project are in general purpose research facilities and a lab-wide resource, the Hazardous Waste Handling Facility.

This project will:

Replace seismically poor and deficient buildings that can not be cost-effectively upgraded

- One replacement research laboratory/office building is constructed (43,000 gsf)
 - o Multi-program, general-use conventional research building (70% research laboratory and 30% research office)
 - o Relocate and consolidate staff and programs in safe and more functionally efficient building - allowing for efficiencies and consolidation.
- Three buildings and five trailers are demolished. (43,060 gsf)
 - o Bldgs. 25, 25B, 55 Trailers 71C, 71D, 71G, 71J, 71P

An additional 12,172 gsf of DOE buildings are demolished concurrently by LBNL, and ~36,000 gsf of DOE footprint off-site leased space is vacated when the new building is completed.

Total net reduction in the DOE footprint is 48,232 gsf.

Upgrade and modernize seismically poor buildings which can be cost-effectively improved to safely address modern mission needs.

- Bldg. 85, the Hazardous Waste Handling Facility (HWHF), a 15,405 gsf building; the project will:

- o install a subsurface retention system to ensure ancient landslide deposits under the HWHF remain stable during a major earthquake.
- o seismically upgrade first story sheer walls and other lateral force systems.
- Bldg. 74, a 45-years old, 45,382 gsf general-purpose research laboratory/office building, and the project will:
 - o upgrade the building systems to meet modern research expectations while the programs and staff are relocated for a concurrent seismic upgrade of the building.

Note: Laboratory Operating funds will be committed to support the SC Modernization Initiative in order to demolish:

Four buildings and four trailers (12,172 gsf)

- o Bldgs. 55A, 56, 60, 63
- o Trailers. 90C & 71F, K, Q

FY2011 Candidate - Seismic Safety of General Purpose Buildings, Phase 3

[SC Project 1(b)]

TEC – \$91M (mid-point of construction)

Deferred Maintenance Reduced: \$1.0M

CAMP: 76.2 RPM: 292

Unacceptably high seismic life safety risks are corrected in general-purpose research and lab-wide resource buildings.

The seismic safety risks to be addressed in this project are in general purpose research facilities and lab-wide resources such as medical (Bldg. 26), dining (Bldg. 54), and facilities shops (Bldg. 76).

This Project will:

Replace seismically poor and deficient buildings that can not be cost-effectively upgraded and relocate staff and programs (net reduction in DOE footprint of 39,000 gsf under this project; this is “space banked” for use in Project 3);

- Replacement research laboratory/office building(s) constructed (35,000 gsf)
 - o Multi-program, general-use conventional research space (~70% research laboratory and 30% research office)
 - o Relocate and consolidate staff and programs in safe and more functionally efficient labs and offices - allowing for efficiencies and consolidation
- Six buildings are demolished. (74,000 gsf)
 - o Bldgs. 4, 5, 14, 16, 17, 64

FY2013 Candidate - Seismic Safety of Building 70

[SC Project 2]

TEC – \$84M (mid-point of construction)

Deferred Maintenance Reduced: \$3.722M

CAMP: 76.2 RPM: 292

Unacceptably high seismic life safety risks are corrected in one major building.

This is a major general purpose research facility with approximately 170 research and support staff. Building 70 contains approximately 7% of the Laboratory's total wet and dry laboratory space. This building contains a particularly high percentage of the total wet laboratory space of two SC mission serving research divisions: ~50% SC/NP NSD and ~40% of SC/BER & BES ESD wet laboratory research space.

This Project will:

Upgrade of a seismically poor building that can be made safe and modernized

- One building is upgraded to address seismic life safety risks and modern research performance requirements
 - o Bldg. 70 (63,550 gsf)

FY2015 Candidate - Seismic Safety of Vintage Structures

[SC Project 3]

TEC – \$138M (mid-point of construction)

Deferred Maintenance Reduced: \$6,544M

CAMP: 76.2 RPM: 292

Unacceptably high seismic life safety risks are corrected in vintage buildings.

While some of the smaller buildings and the trailer, have yet to be surveyed, based on previous surveys it is anticipated most will be poor.

These are general purpose research facilities and older trailers/modulars, many of the buildings were built either during WWII or in the early days of the AEC.

This Project will:

Replace seismically poor buildings that can not be upgraded.

- One replacement buildings is constructed (43,000 gsf)
- A net decrease of 51,000 gsf of buildings is achieved. 12,000 gsf of DOE buildings are demolished with LBNL Operating funds (item see below) and 39,000 gsf of vintage space demolished in Project 1(b) is released from the “space bank”.

Upgrade seismically poor buildings that can be upgraded (these buildings to be shifted to Phase 1(b) if funding allows, note; as the seismic surveys are completed in FY 07, other upgradeable buildings may be identified and added to this list); includes modernization

- Buildings upgraded to address seismic life safety risks and modern research performance requirements include
 - o Bldgs. 25A, 58 (17,827 gsf)
 - o Bldg. 46 (60,384 gsf)

Note: Laboratory Operating funds will be committed to support the SC Modernization Initiative in order to demolish:

Eleven buildings and one trailer (12,372 gsf)

- o Bldgs. 5A, 5B, 16A, 40, 41, 44, 50C, 50D, 52, 51F, 52A
- o Trailer 64B

Appendix 6. List of Excess Facilities

Excess Year	ID	Name	Prop Type	Asset Type	gsf	Year Built	Status	RPV	DM	RIC
2006	073A	Utility Equipment Building	Building	501	403	1961	Shutdown Pending D&D	77,992	0	16,120
2006	029A	(vacant) red-tagged	Trailer	501	1,751	1978	Shutdown Pending D&D	337,736	0	
2006	029B	(vacant) red-tagged	Trailer	501	1,440	1978	Shutdown Pending D&D	277,750	0	
2006	029C	(vacant) red-tagged	Trailer	501	1,440	1978	Shutdown Pending D&D	277,750	0	
2006	075E	EH&S Offices	Trailer	501	410	1978	Shutdown Pending D&D	75,432	0	
2007	050D	Offices (limited use-files/storage)	Building	501	4,959	1979	Operating Pending D&D	1,318,529	0	303,634
2007	051	Former Bevatron (Demo Project Underway)	Building	501	96,562	1950	D&D in Progress	32,277,839	0	41,040,550
2007	051A	Former Bevatron (Demo Project Underway)	Building	501	28,478	1958	D&D in Progress	9,513,616	0	12,096,350
2012	044A	ALS offices	Trailer	501	481	1979	Operating	104,040	0	
2012	044B	ENG	Trailer	501	1,441	1979	Operating	265,117	0	
2012	071C	Offices	Trailer	501	511	1968	Operating	94,014	26,396	
2012	071D	Offices	Trailer	501	520	1970	Operating	95,670	4,843	
2012	071G	Offices	Trailer	501	517	1974	Operating	95,117	0	
2012	071J	Offices	Trailer	501	1,289	1978	Operating	237,152	0	
2012	071P	Offices	Trailer	501	511	1981	Operating	94,014	0	
2012	090C	Ops Offices	Trailer	501	1,143	1977	Operating	219,490	0	
2012	071F	Offices	Trailer	725	516	1974	Operating	94,934	0	
2012	071K	Offices	Trailer	725	474	1974	Operating	87,207	0	
2012	071Q	Restroom Trailer	Trailer	725	357	1996	Operating	65,500	0	
2013	004	Offices	Building	501	10,176	1944	Operating	2,810,936	780,317	24,000
2013	005	Laboratories & Research Offices	Building	501	7,176	1950	Operating	2,361,332	572,072	14,000
2013	014	Laboratory and Offices	Building	501	4,201	1944	Operating	1,195,817	386,117	11,000
2013	016	Laboratories and Research Offices	Building	501	11,808	1943	Operating	3,871,554	1,185,788	17,000
2013	016A	Storage	Building	501	339	1960	Operating	42,315	0	13,560
2013	025	Labs, Shops & Ofc-limited use, storage	Building	501	20,304	1947	Operating Pending D&D	6,127,702	0	1,097,600
2013	025B	Waste Treatment Unit Shelter	Building	501	360	1963	Operating	38,350	0	19,400
2013	040	Dry Lab, Assembly & Storage	Building	501	993	1947	Operating	240,040	28,240	39,720
2013	041	Dry Lab, Assembly & Storage	Building	501	995	1948	Operating	256,823	77,272	39,800
2013	044	Dry Lab, Assembly & Storage	Building	501	805	1956	Operating	174,121	0	32,200
2013	052	Dry Laboratory & Offices	Building	501	6,425	1943	Operating	2,076,346	661,720	14,000
2013	052A	Storage	Building	501	516	1961	Operating	137,197	0	20,640
2014	055	Laboratories and Research Offices	Building	501	19,048	1951	Operating	7,513,818	0	1,905,000
2014	055A	Laboratory & Research Office	Building	501	1,529	1985	Operating	458,467	36,780	102,615
2014	056	Accelerator & Research Office	Building	501	1,782	1976	Operating	709,316	27,423	119,127
2014	060	Highbay Lab	Building	501	3,615	1979	Operating	787,330	76,667	241,663
2014	063	Laboratories	Building	501	2,696	1963	Operating	786,486	22,152	180,228
2016	064	Laboratories, Shops, Assembly & Offices	Building	501	29,358	1951	Operating	9,901,510	1,097,509	0
2016	064B	FAC	Trailer	501	480	1977	Operating	88,311	11,423	
2020	017	Shop, Assembly & Offices	Building	501	2,222	1949	Operating	652,946	52,096	0
2020	050C	Offices	Building	501	2,787	1980	Operating	696,631	0	39,343
2020	051F	ES, EET	Trailer	501	1,499	1979	Operating	275,788	42,011	

Appendix 7. FY2007 Facilities & Infrastructure (F&I) Performance Measures



FY 2007

*Facilities and Infrastructure:
Real Property and Construction Project Management*

Performance Assessment Model

Lawrence Berkeley National Laboratory

University of California Laboratory Management Office

Department of Energy - Berkeley Site Office

October 01, 2006

Third Quarter Revisions

April 1, 2007

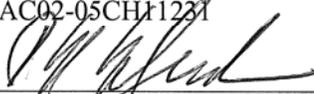
FY07 PAM Rev A – Page 1 of 7

Background Information

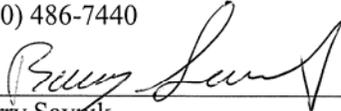
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DE-AC02-05CH11231

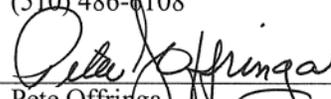
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Effective Approval Date:

April 1, 2007

Introduction

The Facilities Management Functional Managers from the Lawrence Berkeley National Laboratory (LBNL), the Department of Energy (DOE) Berkeley Site Office, and the University of California Laboratory Management Office have agreed to assess the Performance Measures in Appendix B according to the methodology described below.

Performance Objectives:

Goal #7: Sustain excellence in Operating, Maintaining, and Renewing the Facility and Infrastructure Portfolio to Meet Laboratory Needs.

Objective 7.1: Manage Facilities and Infrastructure in an efficient and Effective manner that optimizes usage and minimizes Life Cycle costs. (50 pts)

7.1.1 Maintenance and Utility Reliability- Effectiveness and efficiency of maintenance activities to maximize the operational life of facility systems, structure and Components. (25 points)

7.1.1.1-The MII expressed as a percentage, is defined as the actual maintenance expenditure divided by the Replacement Plant Value (RPV) for conventional Facilities at the Site. FY07 RPV Basis of \$650,000,000(10 pts)

$$\text{MII} = \frac{\text{Actual Maintenance Expenditures}}{\text{RPV}}$$

A+	4.3	MII of 2.15 or greater
A	4.0	MII of 2.10 – 2.14
A-	3.7	MII of 2.05 – 2.09
B+	3.4	MII of 2.0 – 2.04
B	3.0	MII of 1.93 – 1.99
B-	2.7	MII of 1.85 – 1.92
C+	2.4	MII of 1.77 – 1.84
C	2.0	MII of 1.70 – 1.77
C-	1.7	MII of 1.63 – 1.69
D	1.0	MII of 1.55 – 1.62
F	0.7	MII of 1.55 or less

7.1.1.2 – The ACI is (1) one minus the Facility Condition Index (FCI). FCI is the ration of Deferred Maintenance (FY07 DM basis of \$51,838,385 and FY07 RPV basis of \$775, 779,708) to Replacement Plant Value (RPV). Measure is calculated in terms of \$ reduction of DM.(5 pts.)

$$\text{ACI} = 1 - \text{FCI} \quad \text{or} \quad \text{ACI} = 1 - \frac{\text{DM}}{\text{RPV}}$$

A+	4.3	\$3.67 or greater
A	4.0	\$3.17M
A-	3.7	\$2.67M
B+	3.4	\$2.17M
B	3.0	\$1.67M
C	2.7	\$1.17M
D	2.4	\$1M to \$1.16M
F	.0	Less than \$1M

7.1.1.3– Completion of RPAM- required reports (10 pts.)

Task #	Task	Weighting
1	FY07 Condition Assessment Summary Report (20% required per year or on 5 year cycle)	40%
2	FY06 Actual Maintenance Report (Due Oct 30, 06) FY07 Required Maintenance Report (Due Dec. 15, 06)	40%
3	Complete an annual LBNL Maintenance Plan. Interim milestones would include 'strawman' review with BSO/SC-31 (30 April), draft maintenance plan (30 June) with final by 30 September.	20%

A	3.7	Complete all 3 Tasks + Additional Reports
B+	2.4	Complete 3 of 3 Tasks
C+	1.0	Complete 2 of 3 Tasks
D	0.0	Complete 1 of 3 Tasks

7.1.2 Energy and Utility Management initiatives are managed through the FY 2007 LBNL Energy Management Performance Agreement (EMPA), which includes a Comprehensive Energy/Utility Management Program and Plan (CEMP). Effective and successful completion of this measure will be graded as follows (15 points):

A+	4.3	Complete all five (5) EMPA Required Objectives at the "Far Exceeds Expectations" level.
A	4.0	Complete all five (5) EMPA Required Objectives at the "Exceeds Expectations" level.
A-	3.7	Complete three (3) of the five (5) EMPA Required Objectives at the "Exceeds Expectations" level and the other two (2) at "Meets Expectations".
B+	3.4	Complete all five (5) EMPA Required Objectives at the "Meets Expectations" level.
C	2.0	Complete three (3) of the five (5) EMPA Required Objectives at the "Meets Expectations" level.
D	1.0	Complete all five (5) EMPA Required Objectives at the "Needs Improvement" level.
F	0.0	Does not perform any measurable actions on any one of the five (5) Required Objectives.

* Partial credit for tasks can be awarded

7.1.3 Real Property Management Space/Facility Utilization - Effectively managed consistent with mission, requirements, and DOE direction. Intent is to measure the effectiveness, completeness, and timeliness of implementation of Real Property management using Facilities Information Management System (FIMS) office space utilization, facilities asset and utilization index (AUI), and real property leases. (10 Pts.)

Task #	Task
1	Populate FIMS with Executive Order 13327 required data elements
2	Document underutilized or unsuitable excess space and AUI, and recommend its inclusion in FIMS and the Ten-Year Site Plan.
3	Explore and recommend off-site leased opportunities. List off-site lease options in satisfying space requests.
4	Ensure FIMS consistency with other DOE databases. Produce documentation that shows quarterly reconciliation between FIMS and Management and Analysis Reporting System (MARS).
5	Ensure FIMS supports Space Banking Reporting. Prepare annual memo to DOE regarding Space Banking, reflecting FIMS archived square footage, facilities flagged as excess and excess years.
6	Complete Internal FIMS Data Validation per DOE requirements.

A	4.0	Complete all 6 Tasks
B+	3.4	Complete 5 of 6 Tasks
B-	2.7	Complete 4 of 6 Tasks
C	2.0	Complete 3 of 6 Tasks
D	1.0	Complete 2 of 6 Tasks
F	0.0	Complete 1 of 6 Tasks

Objective 7.2: Provide Planning for and acquire the Facilities and Infrastructure required to support Future Laboratory Programs. (50 Points)

7.2.1 Integrated Site Planning - The Laboratory develops, documents, and maintains an integrated site planning process that is aligned with DOE mission needs and the Laboratory strategic/business plan. Intent is to measure the effectiveness of integrated site planning activities using any related site development planning documents. Each task is assessed individually. (20 points)

Task #	Task	Weighting
1	Prepare and ensure DOE Planning Documents such as the TYSP addresses LBNL strategic goals, SC's guidance and BSO comments.	50%
2	Review selected proposals for NEPA/CEQA compliance. Review and process research, construction, maintenance, and operations proposals for NEPA/CEQA compliance.	30%
3	FEMA 310 Seismic evaluations: Complete 100% of bldg inventory	20%

A	4.0	Exceed expectations
B+	3.4	Meets expectations
C	2.0	Needs improvement
D	1.0	Minor accomplishments
F	0.0	No accomplishments

7.2.2 Construction/Project Management - Activities and requirements related to Line Item projects are complete within preliminary performance baselines for scope, schedule and cost (established at CD-1) or performance baselines (established at CD-2). Each task is assessed individually. (30 Points)

Task #	Task	Weighting
1	Adhere to performance baselines for the Molecular Foundry	10%
2	Adhere to performance baselines for the B77 Phase 2	25%
3	Adhere to performance baseline for the User Support Building	25%
4	General Plant Projects (GPP) Program. Managed in accordance with LBNL's GPP priority list and associated cost and schedule.	25%
5	Adhere to performance baseline for the Seismic Phase I	15%

A	4.0	Exceed expectations. Performance against one of the project/program's baselines (scope, schedule or cost) is clearly exceeded.
B+	3.4	Meets expectations. Performance baselines are met.
C	2.0	Needs improvement. Performance against one of the project/program's baselines (scope, schedule or cost) is not achieved.
D	1.0	Minor accomplishments. Performance against two of the project/program's baselines (scope, schedule or cost) is not achieved
F	0.0	No accomplishments. Project/program requires HQs intervention (re-base lining) due to performance deficiencies.

Grade Conversion Table

Letter Grade	GPA
A+	4.1 - 4.3
A	3.8 - 4.0
A-	3.5 - 3.7
B+	3.1 - 3.4
B	2.8 - 3.0
B-	2.5 - 2.7
C+	2.1 - 2.4
C	1.8 - 2.0
C-	1.1 - 1.7
D	0.8 - 1.0
F	0.0 - 0.7

Appendix 8. Inventory and Map of Buildings

Status of Seismic Safety Building Surveys including Donner Laboratory

July 24, 2007

GSF

Total Building and Trailer Area at LBNL Hill Site: 1,775,241
 Square Feet of Donner Laboratory occupied by LBNL: 21,099 - approximately half the building
 Total Building and Trailer Area of LBNL Surveyed: 1,796,340

Survey & Ratings Complete: 1,557,859
 Surveys in Progress (FY2007): 50,643
 Surveys & Evaluations to be Completed in FY2008: 187,838

GOOD and FAIR (No Life Safety Action Required)

Bldg. #	Primary Use	GSF	Rating
090	Research and Operations Offices	89,586	Good
084	Research Laboratory and Offices	55,031	Good
28	Radio Communications Building	494	Good
065	Operations Offices	3,411	Good
075	Operations Offices and Research Support Laboratory	8,498	Good
31	Research Laboratory and Offices	7,327	Good
084B	Utility Building	1,633	Good
67	Research Laboratory and Offices	90,712	Good
67A	Utility Building	6,643	Good
072C	Research Laboratory and Offices	7,886	Good/Fair
083	Research Laboratory and Offices	6,995	Fair
088	88 Cyclotron	52,970	Fair
050E	Research Support Offices	10,884	Fair
050F	Research Offices	9,443	Fair
047	Research Offices	6,242	Fair
007	Research Laboratory, Support Space and Offices	21,433	Fair
41	Communications Lab	995	Fair
048	Fire Station, Emerg. Command Ctr.	6,243	Fair
004	Research Laboratory and Offices	10,178	Fair
080A	Research Offices	960	Fair
050B	Research Laboratory and Offices	63,561	Fair
050A	Research Laboratory and Offices	66,489	Fair
005	Research Laboratory, Shops and Offices	7,176	Fair
069	Operations Offices and Services	20,455	Fair
066	Research Laboratory, Offices and Auditorium	44,134	Fair
080	Research Laboratory, Shops and Offices	30,042	Fair
071B	Research Offices	7,062	Fair
070A	Research Laboratory, Shops and Offices	67,568	Fair
002	Research Laboratory, Shops and Offices	85,760	Fair
062	Research Laboratory, Shops and Offices	55,903	Fair
053	Research Support Laboratory and Offices	6,935	Fair
072A	Research Laboratory	2,532	Fair
077	Research Assembly Laboratory, Shops and Offices	68,768	Fair
060	Research Laboratory	3,400	Fair
077A	Research Assembly Laboratory, Shops and Offices	10,862	Fair
055A	Research Laboratory	1,535	Fair
072B	Research Laboratory	4,413	Fair
TOTAL GOOD and FAIR		944,159	

TO BE SURVEYED in FY2007 & FY2008

Bldg. #	Primary Use	GSF	Rating
016	Research Laboratory and Offices	11,808	TBD
40	Facilities Shop and Offices	993	TBD
063	Research Laboratory	2,702	TBD
027	ALS Support Facility	3,288	TBD
045	Fire Apparatus	3,342	TBD
046A	ENG Division Offices	5,344	TBD
058A	Research Laboratory, Shops and Offices	12,653	TBD
075A	EH&S Laboratory	4,000	TBD
078	Facilities Shop Support	6,513	TBD

50,643

Note: Trailers and Small Structures will be Evaluated in FY2008, these total an additional 187,838 sf

TOTAL TO BE SURVEYED/EVALUATED

238,481

POOR

Bldg. #	Primary Use	GSF	Corrective Action Plan
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Upgrade Funded

006	Advanced Light Source	117,000	BES funded upgrade (multi-year project)
072	Research Laboratory and Offices (NCEM)	6,105	Upgrade in progress
050	Research Laboratory, Offices and Auditorium	48,519	Seismic Phase 1
074	Research Laboratory and Offices	45,526	Seismic Phase 1
		217,150	

Projects Planned**Upgrade**

085	Hazardous Waste Handling Facility	17,724	Upgrade - Project 1(a)
026	Health Services/Medical Facility	10,563	Upgrade & Modernize - Project 1(b)
054	Cafeteria	15,428	Upgrade & Modernize - Project 1(b)
076	Facilities Shops	32,224	Upgrade & Modernize - Project 1(b)
070	Research Laboratory, Shops and Offices	63,330	Upgrade & Modernize - Project 2
046	Research Laboratory, Shops and Offices	60,591	Upgrade & Modernize - Project 3
025A	Research Laboratory, Shops and Offices	7,549	Upgrade & Modernize - Project 3
058	Research Laboratory, Shops and Offices	10,321	Upgrade & Modernize - Project 3
		217,730	

Replace & Demolish

055	Research Laboratory and Offices	19,028	Replace & Demo - Project 1(a)
056	Mini Cyclotron supporting Bldg. 55 and Laboratory	1,782	Replace & Demo - Project 1(a) (IOP \$)
014	Research Laboratory and Offices	4,201	Replace & Demo - Project 1(b)
064	Research Laboratory, Shops and Offices	28,179	Replace & Demo - Project 1(b)
017	Research Support Highbay and Offices	2,251	Replace & Demo - Project 1(b)
050C	Research and Operations Offices	2,767	Replace & Demo - Project 3 (IOP)
044	Research Laboratory and Offices	805	Replace & Demo - Project 3 (IOP)
071A	Research Laboratory, Shops and Offices	4,127	Replace & Demo - Project 3 (IOP)
		63,140	

Action TBD and Planned

1	Research Laboratory and Office (UCB owned On-campus)	21,099	Net sf used by LBNL TBD
079	Research Support/Operations Highbay	4,453	TBD
		4,453	

TOTAL POOR**502,473**

VERY POOR

Bldg. #	Primary Use	GSF	Corrective Action Plan
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Upgrade Funded

010	Research Laboratory, Shops and Offices	15,545	Demolished FY07 (BES\$ - USB Project)
071	Research Laboratory, Shops and Offices - <i>Action 1 Funded; Actions 2 & 3 to be funded</i>	59,404	Three Actions Planned - (1.) HILAC & HILAC shielding removal project in progress (SLI \$); (2.) Three Structural Deficiencies to be Mitigated (TBD), and, (3.) North Annex Structural Deficiency to be Mitigated (TBD)

74,949

Projects Planned**Upgrade**

None		0	
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Replace & Demolish

025	Research Laboratory, Shops and Offices	20,306	Replace & Demo - Project 1(a)
025B	Building 25 Treatment Facility	360	Replace & Demo - Project 1(a)
050D	Research Offices	4,959	Replace & Demo - Project 3 (IOP)
052	Cable Winding Facility	6,425	Replace & Demo - Project 3 (IOP)

32,050

Action TBD and Planned

073	Research Laboratory and Offices	4,228	TBD
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4,228

TOTAL VERY POOR**111,227**

Appendix 9. Facility Operation Measurement Factors Defined

The following quantitative performance metrics have been discussed by and applied by DOE SC in recent years. As some may not be familiar to all readers, this Appendix provided background information.

Facilities and Infrastructure

Facilities Condition Index (FCI)

$$\text{FCI} = \frac{\text{\$deferred maintenance}}{\text{\$RPV}}$$

This widely used metric provides insight into the effectiveness of the maintenance program. It measures the relative cost of remedying maintenance deficiencies listed in the deferred maintenance backlog and conveys condition information.

Asset Condition Index (ACI)

ACI = 1 – FCI and provides a declining scale matching the maintained condition of a building.

Deferred Maintenance (DM)

Deferred maintenance is defined as maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed to a future period. It specifically excludes major "like-in-kind" rehabs normally funded from General Plant Project/General Purpose Equipment (GPP/GPE) and line-item projects.

Rehabilitation and Improvement Cost (RIC)

This indicator is defined as the total of all rehab and improvement costs, including needed function or capacity upgrades and the costs to bring the facility in compliance with all applicable building codes, such as Americans with Disability Act/Uniform Federal Accessibility Standards (ADA/UFAS) and Life Safety requirements, as well as the costs to make facilities suitable for planned mission needs. This metric provides insight into the overall management of facilities.

Rehabilitation and Improvement Cost Index (RICI)

The Rehabilitation and Improvement Cost Index is RIC divided by the facility's Replacement Plant Value (RPV).

Total Summary Condition Index (TSCI)

TSCI = the sum of Deferred Maintenance (DM) + Rehab and Improvement Costs (RIC)
the facility's Replacement Plant Value (RPV)

Rehabilitation and Improvement Cost (RIC)

As the first DOE National Laboratory, Berkley Lab has a number of older buildings. Many of these buildings are fundamentally sound, but the building systems and the spaces reflect the nature of science at the time they were constructed rather than modern research requirements. With upgrades, these buildings can continue to serve the DOE mission for many additional decades. The need for upgrades is a major theme of this TYSP. Over the course of the next year, LBNL will refine the RIC figure.

A major indicator of building conditions is the Facility Condition Index (FCI), which is defined as dollars of deferred maintenance for a building, trailer, or utility system divided by the Replacement Plant Value (RPV) for that building, trailer, or utility system. The Asset Condition Index (ACI) is simply 1 minus the FCI. While the ACI provides an accurate representation of the maintained state of an asset, it may not provide a complete picture of the asset's condition.

The life-cycle status of each of the various subsystems comprising the asset needs to be determined and evaluated along with code deficiencies and other non-maintenance considerations in order to complete the condition analysis. This evaluation develops a Rehabilitation and Improvement Cost (RIC). To determine this RIC for buildings and trailers, LBNL currently uses an analysis tool patterned after the RS Means methodology used by FIMS for RPV calculation.

A significant part of VFA's detailed condition assessment of Laboratory assets is the preparation of life-cycle-based renewal information and code deficiencies. As more experience is gained with the VFA assessment and methodologies, it is anticipated that their actual inspection and evaluation data will replace the current, more qualitative RIC calculation method.

Rehab and Improvement Cost (RIC)*	\$132,343,201
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*Does not include personal property trailers

Total Rehabilitation and Improvement Costs (TRIC)

The 2007 figure (the sum of Deferred Maintenance (DM) and RIC) is: \$184,246,654

Facility Condition Index (FCI)

A facility condition index (FCI) value is simply the cost required to correct all deficiencies in a building divided by the total replacement cost of that building. This FCI value is a useful tool for comparing the relative condition of all buildings. This tool will be useful in determining which buildings or systems should be considered for major renovations or upgrades, and to guarantee that funding sources have been identified for each project, assuring that each deficiency is

properly addressed. Altogether, this would be a powerful tool useful in the development of a five-year or longer capital renewal model that shows the needs versus available funding and the resultant FCI.

The 2007 figure (Deferred Maintenance (DM) as a percentage of RPV) is: 0.064

Total Summary Condition Index (TSCI)

The 2007 index figure (the sum of DM and RIC as a percentage of the RPV), and the associated Rehab & Improvement Cost Index follow:

Total Summary Condition Index (TSCI): (percent of Total RPV)	0.228
Rehab & Improvement Cost Index (based on RIC/percent of Total RPV)	0.164

Facilities Management: Space Management and Utilization

Asset Utilization Index (AUI)

The Asset Utilization Index (AUI) is the Department of Energy's corporate measure of facilities and land holdings against requirements. The index reflects the outcome from real property acquisition and disposal policy, planning, and resource decisions. The index is the ratio of the area of operating facilities, justified through annual utilization surveys (numerator), to the area of all operational and excess facilities without a funded disposition plan.

AUI (Asset Utilization Index from RPAM Order)	0.96 (excellent)
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LBNL assets are nearly 100% utilized, with the exception of the Bevatron complex and a few small condemned structures. LBNL's overall average AUI is currently 0.959, as derived from the data in FIMS. The rating assigned to the AUI of 0.959 is "Excellent." Our goal is to further improve the AUI as excess facilities are eliminated and consolidation increases the space utilization rate of our remaining facilities.

Appendix 10. FY2007 Comprehensive Energy Management Program Goals

FY2007 CEMP Goals

FY2007 is a transitional year in which the lab will be moving from meeting directed energy goals to setting a vision and path for enhancing energy management across divisions. The FY2007 goals are focused toward sustained compliance with regulations, and centered with Facilities energy management activities and the transitional steps necessary to move LBNL to a lab-wide, comprehensive plan. Each goal is described below.

Goal 1:

Develop for full implementation in FY2008 an Integrated Comprehensive Energy Management Program and Plan (CEMP) in FY2008.

The Facilities Utility Manager will have the program responsibility to accomplish this goal. The four major tasks are:

- Develop the plan for a centralized system/structure to manage all of the elements of the Lab's comprehensive Energy Program and to identify the duties of the Energy Efficiency Coordinator.
- Incorporate the Facilities Energy Program into this comprehensive plan structure.
- Identify and incorporate the EETD energy activities into the comprehensive plan Structure.
- Identify other divisions/areas where energy management activities and requirements exist at LBNL.

Goal 2:

Identify the measures, milestones and deliverables in meeting the requirements of Objective 1—Malosh Guideline memorandum.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

Develop a Comprehensive Energy Management Plan (CEMP) that meets the minimum requirements under DOE O 430.2A and Objective 1 of the Malosh Guidance memorandum dated August 3, 2006. To accomplish this goal will require the completion of 75% of goals 1, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 in this Goal Section.

Goal 3:

Reduce Energy Use and Green House Gas emissions through continuous improvement to achieve a minimum target of 2 percent per year (accumulating to a 20 percent reduction by FY2015 as compared to baseline year of FY 2003) to comply with EPAAct2005. This goal is related to Objective 2 – Malosh August 3, 2006 memorandum.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

By reducing our energy usage by 2% relative to the previous year, LBNL will reduce green house gas emissions. During this transitional year LBNL is extending the implementation of past energy conservation measures such as thermostat setbacks, reduced standby system

testing and reduced water temperatures to achieve this energy use reduction. In FY2008 and beyond the energy and water efficiency projects coming on line will produce the reduction results.

Goal 4:

Secure at least 3 percent of electricity purchases from renewable energy sources, to the extent economically feasible and technically practicable. (This can include Renewable Energy Certificates). This goal is related to Objective 3 – Malosh August 3, 2006 memorandum.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

The primary suppliers of electrical power to LBNL include Western Area Power Administration (WAPA), PacifiCorp and a combination of short-term energy purchase contracts managed by an Electric Consortium of LLNL, SLAC and LBNL. WAPA manages the day to day procurements of electricity for the three DOE Labs. For FY2007, the Consortium under the direction of the three labs contractually purchased 3% of renewable energy credits for the Consortium's entire total MWH purchased. LBNL will monitor this process and ensure that we meet or exceed the 3%.

Goal 5:

Design New buildings (scheduled for construction beginning in FY 2008--conceptual design, Title 1, and Title 2) to use 30 percent less energy than the ASHRAE: 90.1 2004 standard, if life-cycle cost-effective. This goal is related to Objective 4 – Malosh August 3, 2006 memorandum.

The Facilities Chief Engineer will have the program responsibility to accomplish this goal.

All new construction at LBNL requires compliance with California Title-24, which specifies the level of energy efficiency requirements. Meeting Title 24 energy requirement exceeds the 30% energy reduction per ASHRAE 90.1-2004 Standard by more than 5%. LBNL will ensure that this standard is met or exceeded on all new buildings being designed under DOE standards.

Goal 6:

Establish a Site Metering Plan that identifies meters to be installed, in accordance with the guidelines of the DOE Advanced Metering Plan, by 2012. This goal is related to Objective 5 – Malosh August 3, 2006 memorandum.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

Develop the site-wide metering plan by June 25, 2007. The Plan will outline the strategy for completing the installation of advanced metering by the end of 2012. The FY2007 portion of the Advanced Metering Plan identifies four (4) advance meters that will be installed and operational by the end of FY2007.

Goal 7:

Initiate the Energy Services Performance Contract process and determine financial cost-effectiveness and feasibility of funding energy and water efficiency projects through an ESPC. This goal is related to Objective 7 – Malosh August 3, 2006 memorandum.

The Facilities Utility Manager will have the program responsibility to accomplish this goal

A site-wide energy and water evaluation will be produced and evaluated for ESPC implementation at LBNL. The Initial Proposal of the ESPC will be completed at the 50% submittal level before September 30, 2007. Since LBNL has been performing energy efficiency retrofits for the past several years, most if not all low cost items have been identified and implemented. In order for the ESPC contract to be financially viable a single sitewide contract will need to be evaluated to determine its cost effectiveness. If determined to meet the financial criteria, the Detailed Energy Survey will need to be completed in FY2008 and an ESPC established. The energy and water audits will be completed by the end of FY 2007. The audit will create a list of energy and water efficient measures to be implemented in FY 2008 and beyond.

Goal 8:

Purchase energy efficient products including Energy Star, FEMP designated and low standby power devices. This goal is related to Objective 9 – Malosh August 3, 2006 memorandum.

The Procurement Department Head will have the program responsibility to accomplish this goal.

It is the current procurement policy at LBNL that all items used in the non-laboratory environment are purchased with Energy Star rating. All computers, refrigerators, etc are purchased with low standby power devices. Currently, LBNL has an Environmental Management Program that also specifies that the Procurement Department must purchase items with Energy Star labels on them. Documentation will be provided to validate the accomplishments of this goal.

Goal 9:

Apply sustainable design principles to new buildings of 10,000 square feet or greater, (i.e., Conceptual Design, Title I, and Title II). This goal is related to Objective 11 – Malosh August 3, 2006 memorandum.

The Facilities Chief Engineer will have the program responsibility to accomplish this goal.

LBNL will ensure that sustainable design principles on new buildings of 10,000 square feet or greater comply with LBNL's Master Construction Specifications which identify specific sustainable building materials that are to be selection. The Master Construction Specifications institutionalize sustainable design, energy efficiency and water conservation practices at LBNL. The newest building onsite is Building 67 – the Molecular Foundry Laboratory. It incorporated sustainable design principles into design and construction. The building will meet the U.S. Green Building Council's LEED[®] Silver accreditation and is a pilot partner in the development of the USGBC's Environmental Performance Criteria for laboratories.

The User Support Building is scheduled for construction in FY2008 and will be self-certified for LEED Silver accreditation per UCOP directive. It is currently in Title 1 Design Phase.

Goal 10:

Conduct energy and water audits to identify cost effective retrofit projects that save energy, water, and operations and maintenance expenses. This goal is related to Objective 13 – Malosh August 3, 2006 memorandum.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

Energy and water efficiency audits will be performed in FY2007. A site-wide ESPC is being implemented at LBNL. The ESPC contractor will conduct both energy and water audits and is scheduled to be completed by September 30, 2007. The audits will create a backlog listing of energy and water efficient measures to be implemented in FY 2008 and beyond. The backlog list will be continually updated when the project is completed or when a project is identified.

Goal 11:

Effectively measure and manage the energy consumption for each of the site's major buildings and operations and establish an incentive program for reducing energy consumption in these facilities. This goal is related to Objective 15 – Malosh August 3, 2006 memorandum.

The Facilities Business Manager will have the program responsibility to accomplish this goal.

Document that all major buildings at LBNL are provided with electrical meters and that the meters are read on a monthly basis. Verify a program has been established to periodically alert users of their energy consumption and ways to reduce this consumption for each of these buildings and operations.

Goal 12:

Designate exemplary new and existing facilities with significant public access and exposure as showcase facilities in order to highlight the energy or water efficiency and renewable energy improvements at those facilities. This goal is related to Objective 16 – Malosh August 3, 2006 memorandum.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

Building 67, the Molecular Foundry, is designated as a showcase facility to highlight the energy and water efficiency and renewable energy. Document how this building is being showcased.

Goal 13:

Ensured that the energy management program will be sufficiently staffed with trained energy managers as needed to accomplish life cycle cost-effective energy efficiency improvements at the site and report progress toward statutory and regulatory requirements. This goal is related to DOE Order O 430.2A, CRD 1b.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

The current standard to meet this goal at LBNL will be met with two qualified energy managers. Facilities Chief of Engineering and one of the Energy Management Engineers meet the definition of trained energy managers. They are Certified Energy Managers. The Facilities Engineering Section also maintains a stable of outside Architectural/Engineering firms to perform energy efficiency studies and retrofit designs. LBNL will maintain this as the minimal level to meet this goal.

Goal 14:

Management systems must be in place to quarterly report the site's energy consumption and cost for fuels by fuel type and energy category, and annually report the site's potable water consumption through DOE's Energy Management System (EMS). EMS is a Web-based data collection and reporting system. This goal is related to DOE Order O 430.2A, CRD 1c.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

LBNL will submit all reports required by DOE to document energy and water conservation in the EMS system. The required reports are identified under the FIMS program. The Energy Management Engineer will independently developing methods to minimize laboratory electrical, natural gas and water/sewer utilities costs by forecasting demand, consumption, rates and costs; educating staff; and developing utility cost savings proposals.

Goal 15:

Outreach programs as needed to motivate employees to modify behavior to become more efficient in their use of energy and water and to minimize waste. This goal is related to DOE Order O 430.2A, CRD 15.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

LBNL will revise and execute its outreach program for on-site energy awareness and outreach activities including placement of periodic articles in LBNL's electronic and print news publications that promote energy efficiency and water conservation in the workplace and at home. LBNL will also promote an Energy Awareness Month and assist in the planning and execution of the annual LBNL-Earth-Day celebration.

Goal 16: LBNL will reduce petroleum fuel usage by 2% per year using FY 2005 as the baseline year in order to meet EO 13423 goals.

The Facilities Fleet Manager will have the program responsibility to accomplish this goal.

In order to improve petroleum fuel usage for the LBNL vehicle fleet, Fleet Operations will implement measures to reduce the total number of LBNL vehicles, continue to purchase alternative fuel vehicles that can run on E85 and continue pursuing the expansion of alternative fuels such as ethanol and bio-diesel.

Goal 17:

Reduce Greenhouse Gases, 3% energy intensity reduction annually, 30% reduction by 2015 relative to FY 2003.

The Facilities Utility Manager will have the program responsibility to accomplish this goal.

This is an enhancement of Goal 3 above. LBNL will execute additional controls to increase the reduction of overall energy use from the 2% required under EPA Act 2005 and the Malosh August 3, 2006 Guidance Memorandum and the 3% requirement of EO 13423.

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